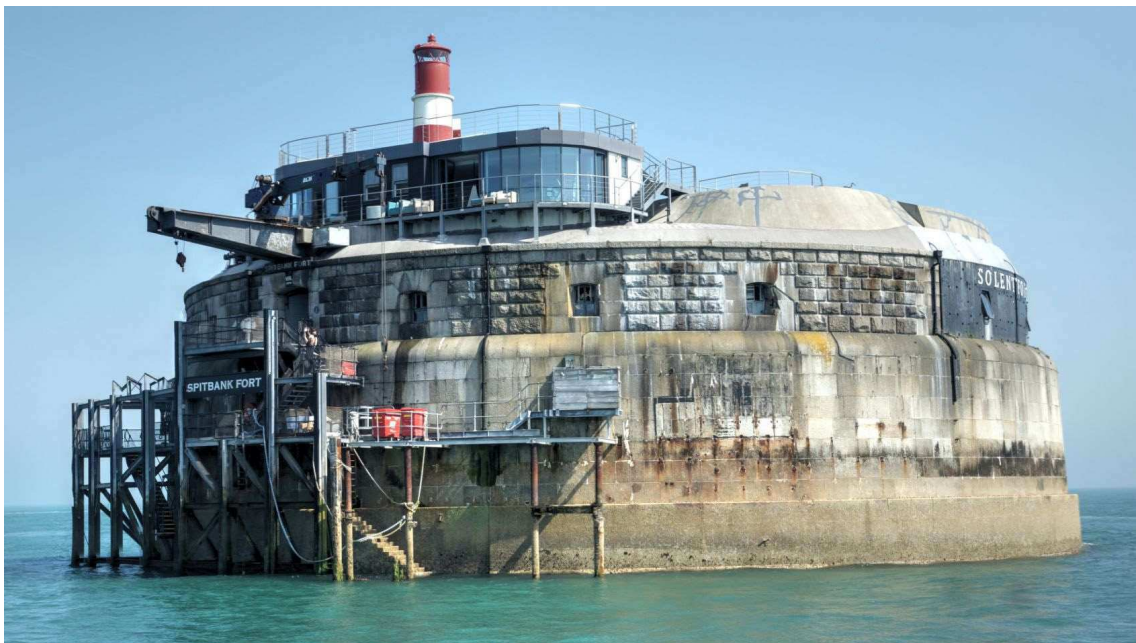


Solent Papers No.1

Spit Bank

and the

Spithead Forts



Garry Mitchell and David Moore

with Anthony Cantwell MA and Peter Sprack



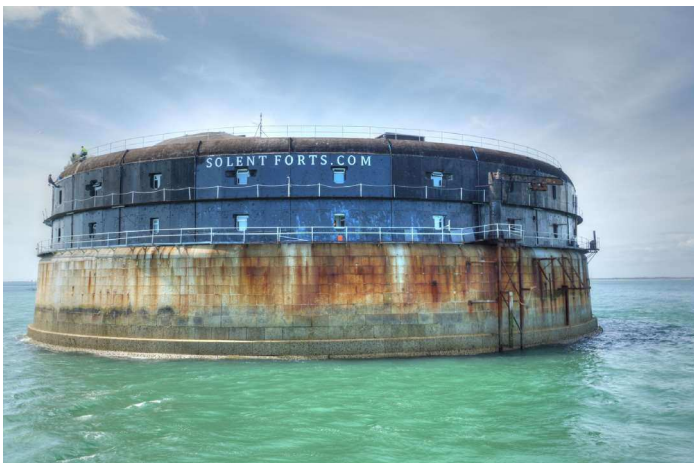
Front cover: Spit Bank Fort in 2012

Above: Spit Bank Fort in 2012 and 2015

Left: Spit Bank Fort in 2012 after restoration

Below: Horse Sand Fort in 2014

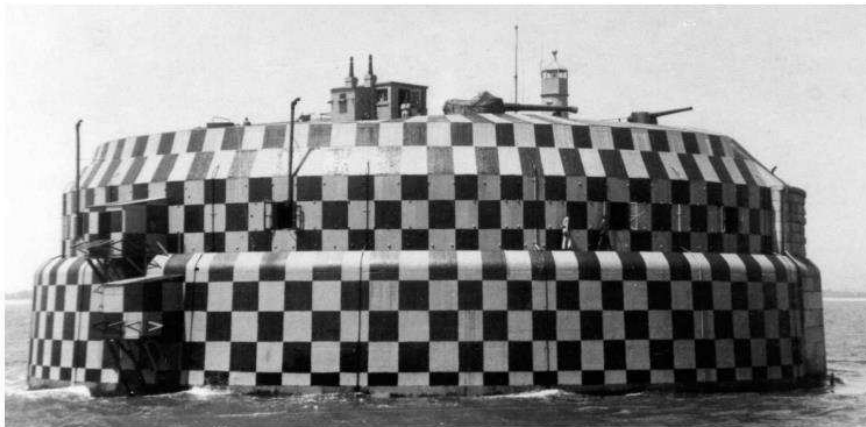
Bottom: No Man's Land Fort in 2014



Solent Papers Number One

Spit Bank and the Spithead Forts

Written by Garry Mitchell and David Moore
with additional information by Peter Cobb.
All Photographs and plans by David Moore and Garry Mitchell
St Helen's Fort by Anthony Cantwell MA with plans by David Moore



Spit Bank Fort in 1938

Titles in the Solent Papers Series

- No. 1 Spit Bank and the Spithead Forts
- No. 2 The Needles Defences
- No. 3 Fort Nelson and the Portsdown Forts
- No. 4 Hilsea Lines and Portsbridge
- No. 5 Fort Gilkicker
- No. 6 Fort Brockhurst and the Gomer - Elson Forts
- No. 7 Fort Fareham
- No. 8 The Stokes Bay Defences
- No. 9 Fort Nelson a History and Description
- No. 10 The East Wight Defences
- No. 11 Fort Rowner
- No. 12 Portsmouth Lines and Southsea Defences
- No. 13 Fort Blockhouse and Fort Monckton
- No. 14 Fort Gomer and Fort Elson
- No. 15 Fort Wallington

This book first published by Gary Mitchell – ISBN 0 947605 03 7
Second edition republished by David Moore – ISBN 0 9570302 0 7
This new 2024 edition is published by the Palmerston Forts Society as a pdf document
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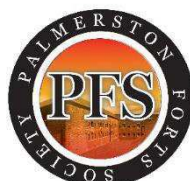
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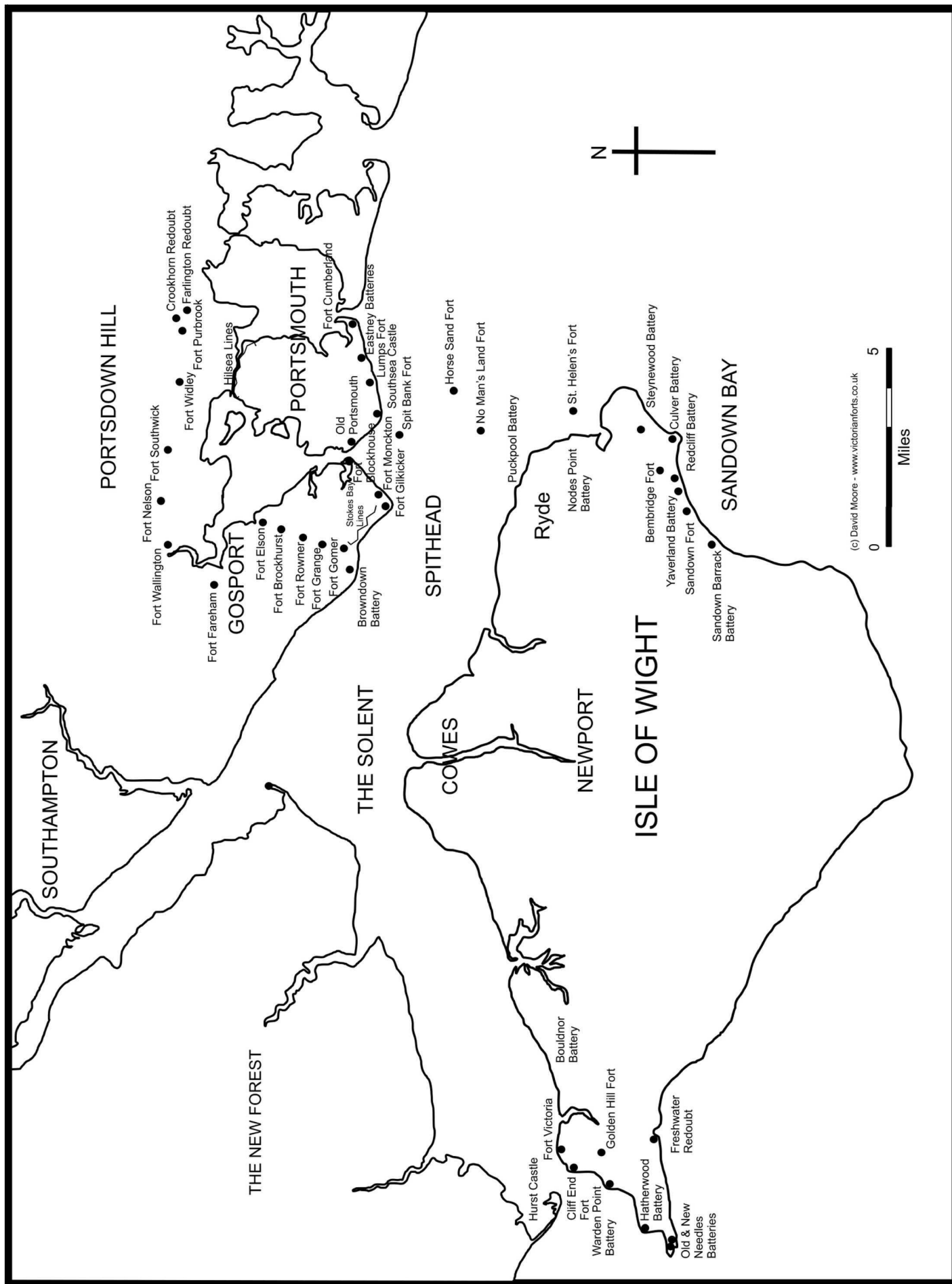


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History

The Spithead forts were built in the 1860's to prevent warships bombarding Portsmouth Dockyard. Portsmouth had been fortified almost from its foundation. Earth ramparts surrounded the town when Henry VIII built Southsea Castle to protect the approaches to the harbour. The defences were remodelled several times and new works built around Portsea and Gosport. Fort Cumberland and the Hilsea Lines - defending the entrance to Langstone Harbour and the northern approaches to Portsea Island - were built during the 18th Century. The battle of Waterloo brought peace to Europe and restored the French monarchy but England remained suspicious and fearful of the French throughout the 19th Century.

In 1848, Europe was again in turmoil. Louis Napoleon, nephew of the great Emperor, became first President of the second French Republic and seized complete power in 1852, proclaiming himself Napoleon III. In England, the new Emperor's motives and ambitions caused concern which was whipped into an invasion scare. The government considered new defence works and two sea forts were proposed - on Horse Sand and No Man's shoals - to protect the seaward approaches to Portsmouth. These were not built.

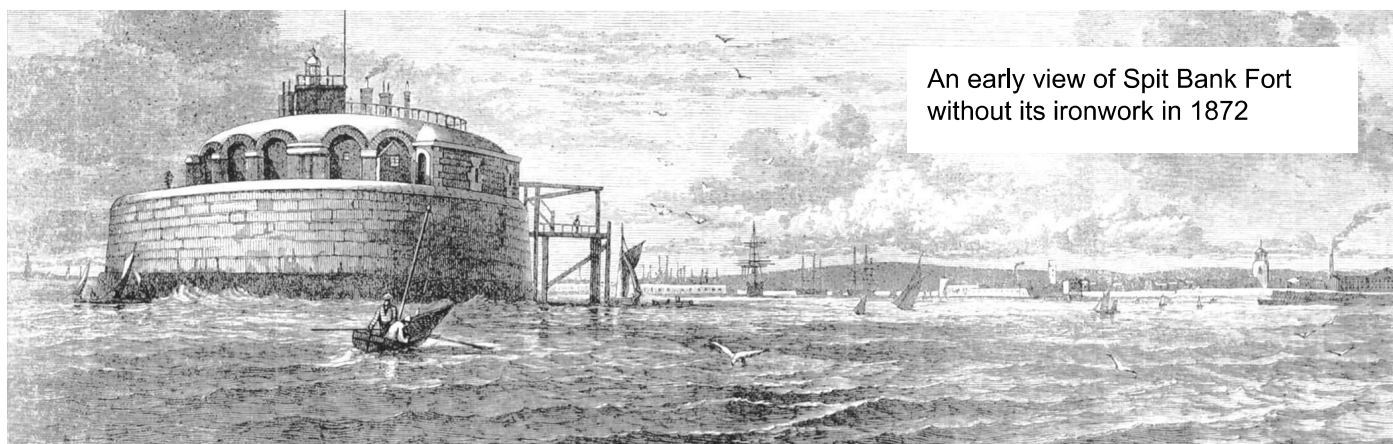
When war broke out with Russia, France and England formed an alliance but afterward rivalry and suspicion returned. Dangerous weaknesses had been revealed in the organisation of the British Army and there was renewed interest in fortifications. In 1857, Col. W F D Jervois, Assistant Inspector General of Fortifications, planned three new land forts between Forts Gomer and Elson, Stokes bay Lines on the sea front, works on the Southsea shore line at Eastney, Forts East and West and Lumps Fort, as well as rebuilding the Hilsea Lines.

Armstrong's rifled breech-loading gun, introduced in 1859, improved range and accuracy. This and the general adoption of steam propulsion for warships revolutionised defence planning and made England's maritime policy obsolete. France had constructed an ironclad steam-driven warship, 'Gloire' and this was seen as a direct challenge to the Royal Navy's command of the English Channel. The British navy would build a fleet of similar warships, the first being the 'Warrior' but coal-burning, steam-driven ships, unlike sail, could not be kept continuously at sea to close-blockade enemy ports. It was also feared that the British fleet would be

lured away to protect the Empire and leave the coast unguarded. Without blockade, the French might land 20,000 men on the English coast in a night. Once ashore they could freely bombard important naval installations. Steam-driven ironclad warships could bombard the dockyard out of range of existing fortifications. There was pressure for action. A Royal Commission, taking evidence from senior Navy and Army officers, decided on a ring of new detached works for the land defence of Portsmouth. They contemplated narrowing the entrance to Spithead with a permanent barrier to protect dockyard and anchorage from ironclads. During the Crimean war, such a barrier, combined with sea forts, had prevented the Allied fleet from attacking the naval base at Kronstadt. The project was rejected. It was too expensive and risked silting up the deep water entrance to Spithead. The Commission approved forts on the Horse and No Man's shoals, additional works on Spit Bank, Sturbridge shoal and Col. Jervois' 'intermediate' fort between the Horse Sand and Southsea beach. They also recommended support batteries at Nettlestone Point and Appley House on the Isle of Wight.

In February 1860 the report was submitted to the government and lengthily debated by Parliament. Several land works and the sea front intermediate and Spit Bank forts were struck out. Eventually the Fortifications Act enabled new works to be funded by terminable loans instead of being voted as part of the Army estimates. The political battles surrounding the Spithead and Portsdown forts were long and bitter and delayed construction of the sea forts for nearly two years. This was not the only difficulty. No satisfactory foundation could be found on the Sturbridge shoal, which was abandoned. Instead the present fort was built on the Spit Bank, 600 yards north east of the original Sturbridge site. A new fort was started on Ryde Sand but this had to be abandoned because of poor foundations, at a cost of £12,000. The batteries at Nettlestone Point and Appley House were replaced by a further fort on the bank at St Helen's.

The battle between the Confederate iron ship Merrimac and the Union Monitor, supported by Fort Monroe, during the American Civil War, raised fresh doubts about the effectiveness of sea forts in naval actions. The Royal Commission was reconvened but decided against replacing the proposed forts with suggested alternatives of floating batteries or obsolete wooden ships cased with iron. Fast torpedo boats were in use by the 1890's and



An early view of Spit Bank Fort without its ironwork in 1872

the forts were rearmed to repel these rather than larger ships. In 1909, the area between Horse Sand Fort and Southsea beach was protected by a line of concrete blocks and piles. A similar line stretched from No Man's Land Fort to the Isle of Wight.

By the First World War, heavy guns were installed on the Isle of Wight, which was better positioned to engage enemy warships. The forts - now equipped with roof mounted 6-inch and 4.7inch guns - were expected to prevent light forces penetrating the Spithead anchorage. No Man's Land fort and, later, Horse Sand Fort became Naval Signal Stations with telephone cables to warn of enemy vessels. The Dover patrol and mine barrage between England and France meant that the English channel was virtually closed to enemy surface vessels and, although the forts were fully manned, they saw little action.

In the 1920's and 1930's, the forts were neglected and received no modern weapons. During the Second World War the main threat was from submarines and light craft. A boom defence was rigged between Horse Sand and No Man's Land forts and an indicator loop was laid to detect enemy craft attempting to force an entry into Spithead. One of the 6-inch guns on No Man's Land fort was designated as an 'Examination battery' and this was used to cover merchant ships, whilst they were boarded and searched for contraband. Horse Sand Fort and Culver battery alternated as the Port War Signal Station, depending upon weather conditions and visibility. With the fall of France in 1940, invasion threatened and the British Government decided to seize or immobilize the French fleet. Several French warships that had escaped from the channel ports were anchored off Portsmouth, including the battleship 'Courbet'. The forts were readied and, for the first and only time in their history,

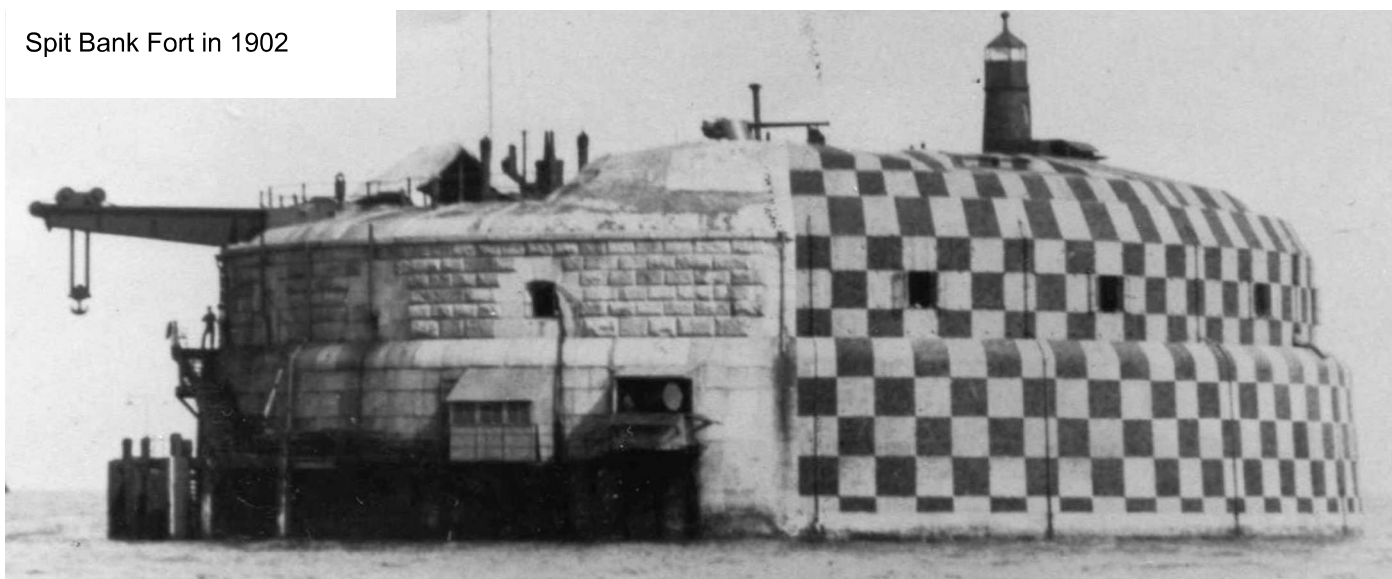
their guns were trained on a French warship - the target for which they had been designed. The ships were seized with few casualties and without need to open fire. Just as well, since the 'Courbet' would have made short work of the sea forts' antiquated armour. The enemy, unwilling to invade directly, began an air offensive. The forts suffered their share and were able to offer only a limited defence with a single 3-inch AA gun and an assortment of machine guns. Cover was added to protect the guns' crews in 1940 but there was no attempt to use the forts for general air defence, as with the forts in the Thames and Mersey estuaries, which were purpose-built.

The forts had little chance to use their 6-inch guns and in late 1942 they were put in a state of 'care and maintenance' and completely de-activated after the war. Coast artillery was abolished in 1956 and the sea forts ceased to have any military value. In 1963, the forts were put up for sale but there were no buyers until the 1980's. Spit Bank was bought by Shaun and Pauline Maguire in 1982. who opened it to the public. They added a new landing stage, largely restored the building and opened it to the public as a museum. In 2009 work began to convert it to a luxury holiday facility by 'Amazing Retreats'. It opened in 2012. St Helen's fort is in private hands and No Man's Land fort was sold to a property company who converted it into a luxury home with its own helipad. In 2012 Horse Sand and No Man's Land were acquired by Clarendon for conversion into a Museum and a Luxury Hotel.

Design and Construction

Although the eastern entrance to the Solent appears wide, sandbanks with less than six feet of water over them at low tide extend out from the mainland and the Isle of Wight. Large ships have to keep to narrow deep

Spit Bank Fort in 1902



water channels going to Southampton or Portsmouth and the sites were selected so that no ship would be more than 1000 yards from any fort, when entering these harbours. At longer ranges an ironclad's armour might not be penetrated by the guns then in service.

The forts were designed by Captain E H Steward RE of Col. Jervois' staff. Experiments had shown that granite alone could not withstand bombardment and the plans were altered to include iron armour on an iron superstructure. This was developed separately by Captain Inglis RE and Lieutenant English RE. Jervois appointed the noted Civil Engineer, Sir John Hawkshaw, as consultant for the foundations. Sir John had advised on the construction of the Severn tunnel and the Hungerford and Cannon St railway bridges in London. He proposed alternative foundation schemes:

The creation of an artificial island by dumping rough stone or concrete blocks on the shoal. Cost £93,000.

Laying down a circular iron caisson on the sea bed and surrounding it with stone and concrete blocks. Cost £156,000.

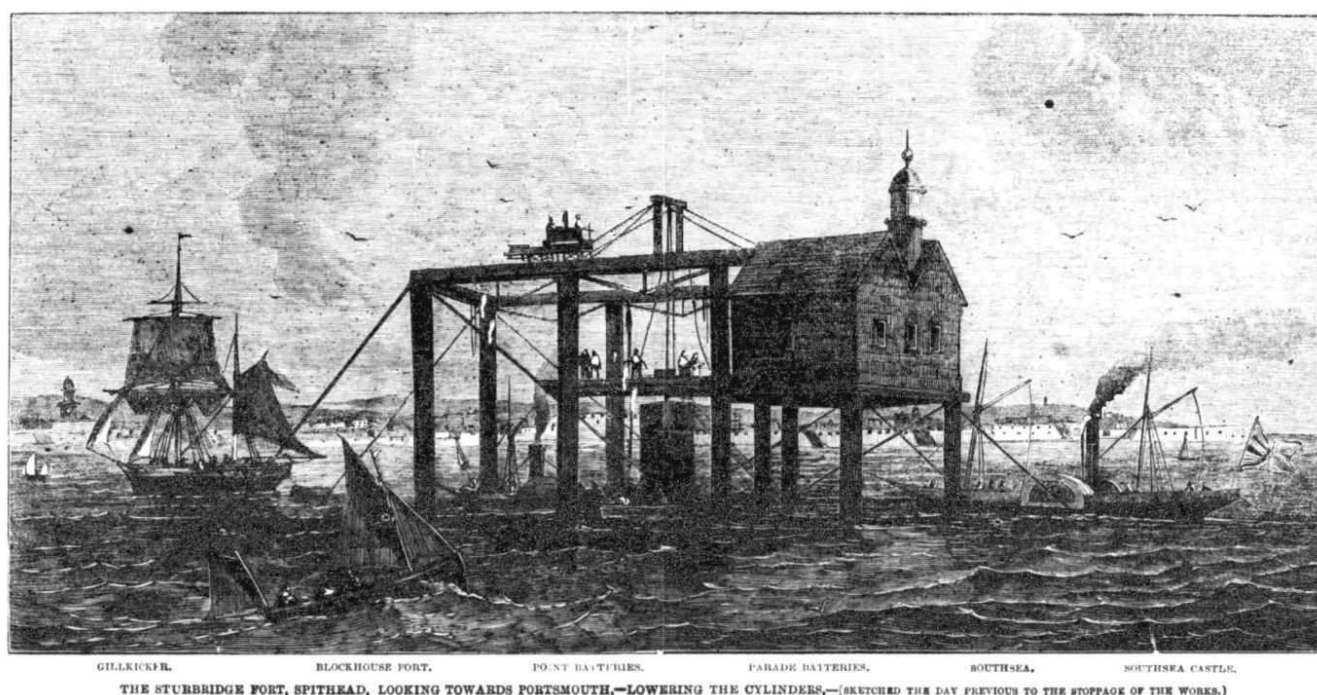
Laying a prepared stone and concrete ring foundation on the sea bed. Cost £163,000.

The last method was chosen for Horse Sand, No Man's Land and Spit Bank, despite the Defence Committee worrying that heavy seas would prevent accurate positioning of the stone blocks. St Helen's fort was built using the second method and will be described separately. Approval was given in September 1860 and construction started the following July. Political pressure forced the work to be suspended from the Spring of 1862 until 1864-5. A contractor, John Towler

Leather, was appointed, with his agent W. Hill and manager Edward Pease Smith. The chief engineer was John Hawkshaw. Before the stones could be laid, a wooden staging mounted on screw piles was built over each site. The platforms were fitted with a steam crane on a circuit of rails and huts for seventy workmen. The contractor also built a pier 50 yards south of the existing railway pier in Stokes Bay, into an enclosed workyard.

Stone from various quarries was delivered to the workyard by rail. The concrete blocks were made on site in wooden formers using local materials. The stone or concrete blocks were checked for fit, trimmed, marked and taken out to site by barge. The crane on the platform then lifted each block out of the barge and lowered it into position under direction of divers working on the sea bed.

The first stones were laid on the Horse and No Man's shoals in March 1865 and on the Spit Bank exactly two years later. The work started seventeen feet below the low water mark and continued until the top of the fourteenth course had been reached, in January 1868. At No Man's Land, the foundations had to go some ten feet deeper, because of the soft ground. With all the forts there were a few problems in keeping the work level and at Spit Bank this was corrected at the eighth course. When the lower parts were finished, there was a considerable delay before the iron superstructure and armour was designed and fitted. The ironwork was supplied by Fairbairn Engineering Company. The armour-plate iron for the shields was supplied by Cammell and Co. of Sheffield.



Approval for the sinking of an artesian well at Spit Bank was given in 1872 but boring did not start until May 1877. Eighteen-inch diameter cast iron tubing was used, the lower twenty-five feet being steel-shod wrought iron. Water was reached at 401 feet on October 18th 1877. The water is said to be quite pure and the well delivers fourteen hundred gallons an hour. The delay in the final design meant that Spit Bank fort was not completed until 1878, Horse Sand and No Man's Land not until the Spring of 1880.

General description of the forts

Horse Sand and No Man's Land are almost identical, with two floors and a basement. Spit Bank is two thirds the size, with a basement and one floor, and is armoured only on the seaward side. The other two are fully armoured. All three are circular. Horse Sand Fort has a diameter of 231 feet at the sea bed narrowing to 205 feet at the top of the sill course. No Man's Land Fort has a diameter of 240 feet at the sea bed, narrowing to 204 feet 9 inches at the top of the sill course. Spit Bank is 162 feet at the bottom, narrowing to 146 feet. All three have a batter of 1 foot in 22 feet 7 inches. At the sea bed, an annulus of masonry was constructed and here Spit Bank's walls are 48 feet thick, the others 59 feet. The facing stones at lower levels are Roach Portland, the upper courses Colcerrow or Cheesewring granite to a height of 15 feet. Inside Bramley Fall and Runcorn stone are used.

Between the two shells, eight-ton concrete blocks were added. The centre is shingle, crowned by a ten-foot layer of concrete. In each fort the basements were used for ammunition and storage.

At Spit Bank, the gunfloor is partly of iron composite armour on an iron superstructure and partly of vaulted brickwork with rusticated granite facing. The superstructure on the other forts is an iron framework supporting iron armour. Each roof is of concrete. The interiors are mostly brick laid in English bond with stone dressings. Some of the brick piers were built to take turrets, five on the larger forts, two on Spit Bank. These, together with the thicker stairwell piers were later used to support more modern roof-top armament. The forts are unornamented, apart from the dressed stone. Only the original chimney pots were decorated and these, alas, are now gone.

The armour, designed after experiments at Shoeburyness, was adequate for the low-velocity guns of the 1860's. Against the weapons in use at the end of the century, it was quite useless. The twenty-five inch thick armour is made up of two five-inch thick layers of iron concrete sandwiched between three of wrought iron. Round the embrasures, the iron concrete layers are replaced by three one-inch wrought iron plates between two one-inch teak panels.

Description of Spit Bank Fort

The fort is approached by a modern landing stage the original having crumbled over the years. A short flight of stairs leads up to the entrance platform. Above this is a loading gantry which enabled stores and ammunition to be brought on to the fort. Further round may be seen the remains of a small building cantilevered out from the fort. This was originally a soldiers' latrine. Above it was a cistern which was replenished with seawater using a hand pump.

Main Floor

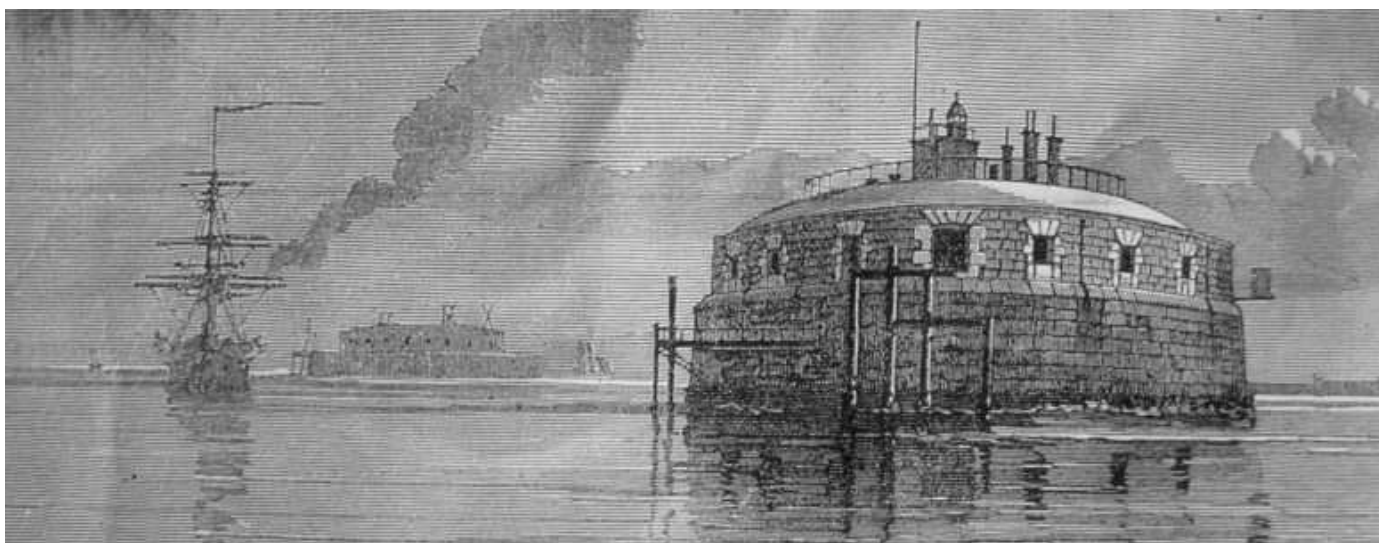
The two-leaf oak and elm door is five inches thick. A tablet above gives the name of the fort. The date 1870 appears on the keystone. The entrance passage, nine foot six high by eight wide leads to the courtyard. There is access to casemates on each side. The left hand casemate was converted to a smithy when the earlier armament was removed in 1898. The forge is by Allday and Onions. Above it are the fittings for the smith's bar stock and a bellows worked by a pole beam. Behind this casemate lay the old guard room and the Staff Sergeant's quarters, which later became the Battery Office. Next is the washroom, which originally had four wash hand basins and a bath. Past this, opening off the passage, was a urinal and night latrine. Behind the adjoining door, steps lead down to the light passage. In the courtyard was a seventy-five gallon water tank, for use with a portable fire pump.

The remaining casemates were variously employed when no longer used for artillery. Beyond the third

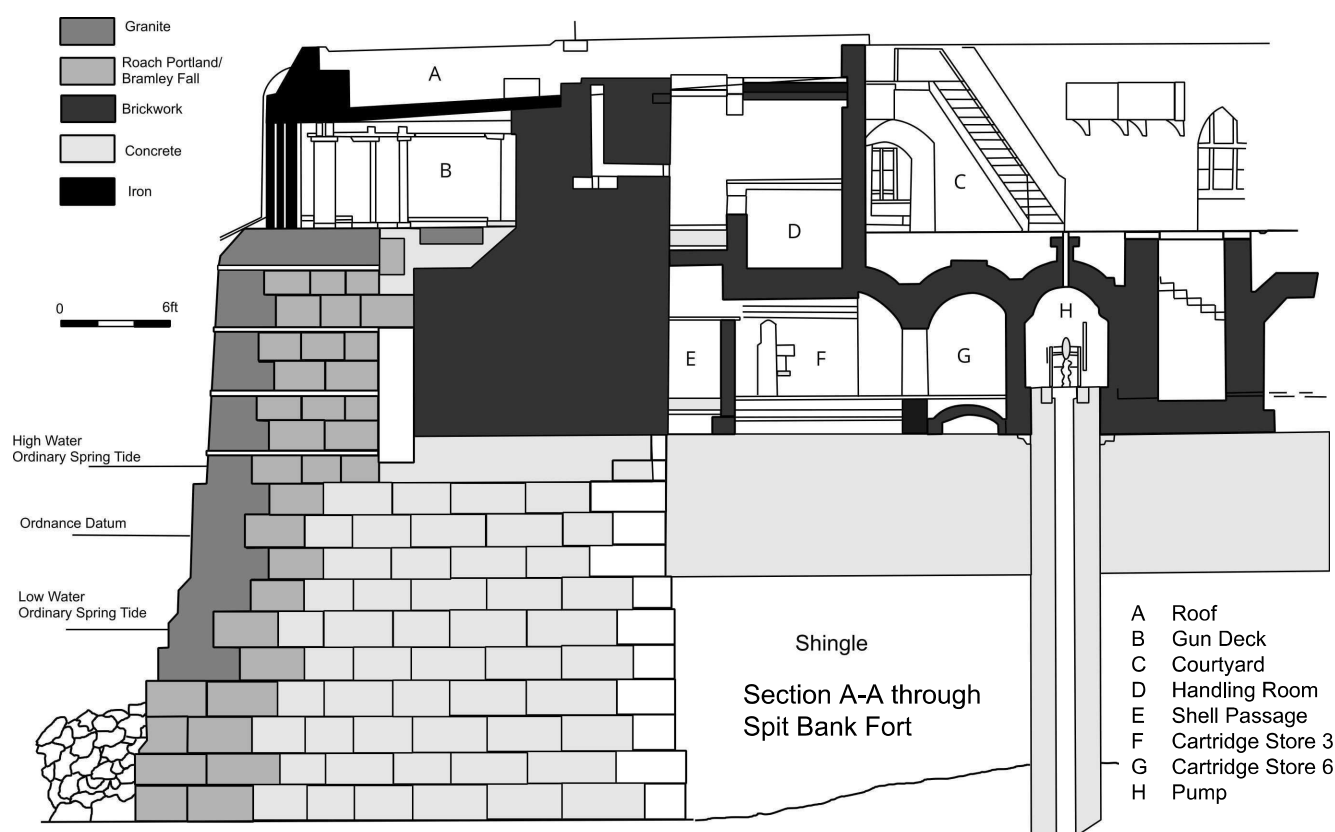
casemate, granite gives way to the iron armour of the seaward face. This area was really a gun gallery, built in open plan, so that you could walk directly from guns 4 to 12. Each gun was mounted on a garrison carriage, which could be traversed through sixty degrees. (A pair of fibre-glass replica 12.5-inch guns were installed in positions 11 and 12 when the fort was operated as a museum by Sean Maguire.)

The gun was traversed by a pinion which meshed with the rack on the floor. The turret bases are marked by semi-circular stone corbels which were set on the angular piers by a series of stepped brick courses. Overhead are bolts with metal plates, used when hoisting guns on and off their mountings. The gallery was subsequently partitioned into mess rooms, canteens and stores. The canteen was used as a rifle range after the last war. The roof is concrete, reinforced with iron segments and supported on the outer edge by square iron columns and beams. The armour plates, which hang outside the beams, overlap, forming an unbroken shield against shot.

Behind the gun gallery were two soldiers' rooms, each for twelve men. The beds, with overhead kit and rifle racks, are fitted in wherever the cramped conditions allowed. Heating was from two Canada stoves on York stone hearths. The rooms were for the peacetime garrison. In war the men would have slept in hammocks, which were kept in the entrance to the room, in racks with numbers corresponding to the hooks from which the hammocks were slung.



Spit Bank Fort: north side in 1872



One of the armoured embrasures leads to two small buildings cantilevered out from the side of the fort. These were the fighting light positions. They were not part of the original fort but were added some time before the First World War to house searchlights. Gun position No.4 was walled off completely and was used to store fuel for the generators. Some of the fuel tanks have been kept in position. Further round, within the granite casemates, there are engine beds which once supported four Lister diesel generators. The floor is of black and red tiles. In one shell recess, in a soundproof box, is a telephone station. An alarm bell outside this called together the engine room staff for briefing and summoned them to Action stations.

Originally, part of the area behind the casemates of guns 1,2 and 3 was divided into three rooms, the laboratory and shifting room (latterly the accumulator room), the officer's quarters and the officer's servant's quarters. The last two had fireplaces.

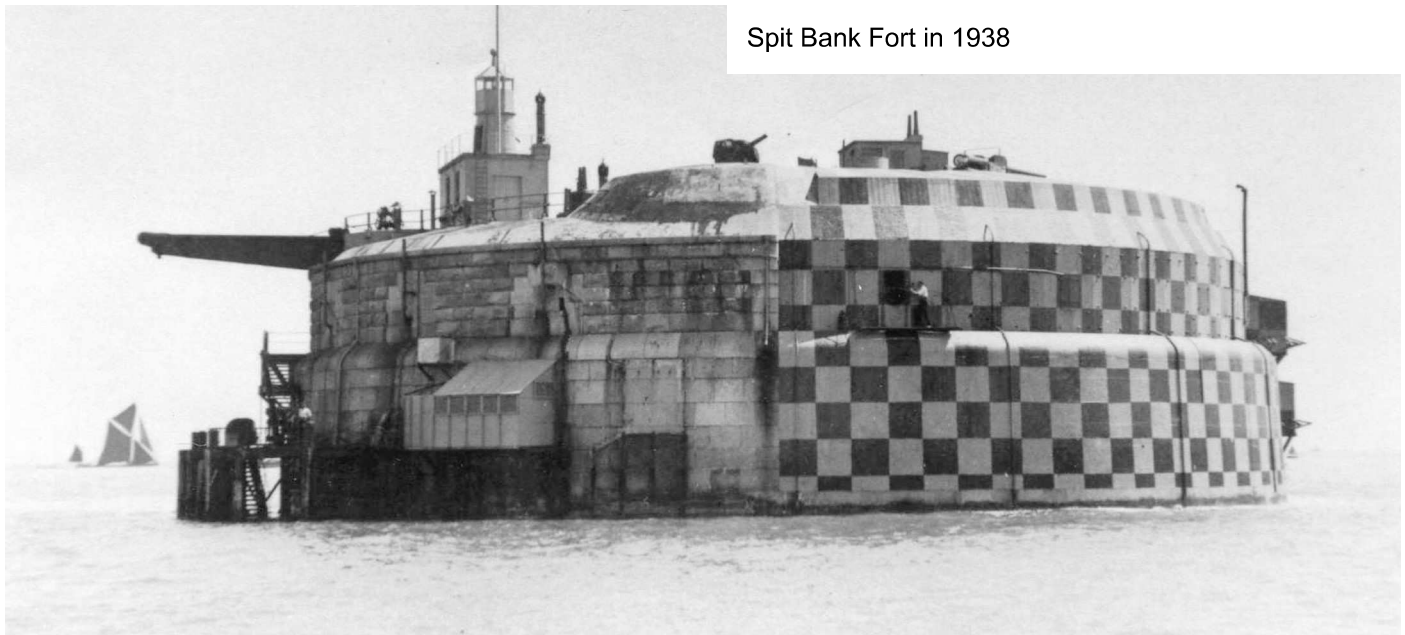
Behind each soldiers' room was the cartridge-handling room, with two issuing hatches opening on to the courtyard. A brick arch was added outside for further protection. Inside was another hatch, reached, as the floor was at mezzanine level, by a small ladder. Farther

round, a small passage opens on to stairs leading down to the magazine. The officer's latrine was in an adjacent room. Here and there the tops of the shell lifts can be seen. These were closed by a single leaf door and contained a simple pulley for handling shells. All but two of the cartridge lifts are in the cartridge handling room. Other lifts for 6-inch ammunition were added in 1906-7.

An iron staircase leads from the courtyard to the roof and the original lookout positions, beneath which are galvanised-iron header tanks. A central oval area gives light and access to the basement. In 1941 this had been covered in with a barrack block, but this has now been removed. A small one-ton derrick and a replica handrail have been refitted in their original positions.

Basement

Stairs lead down from the centre of the courtyard to the basement. On the right is the pump room, with light rooms on either side illuminating the cartridge store, which is not served by the light passage itself. Left of the stairs, a doorway opens into a passage and two small rooms. The original soldiers' kitchen, on the left, has been fully restored. To the right was the provisions store, with meat hooks, marble worktop and cupboards.



Spit Bank Fort in 1938

This room was used as a signal store in recent times, the kitchen having been moved to the gun floor. Past these two rooms, through an iron gate, is the stores area - the Royal Engineers', coal and artillery general stores. At the back of one of these rooms is the entrance to a "bolt passage". This passage, which is only about two and a half feet wide, runs right round the fort and was provided in case it became necessary to add iron armour to the lower part of the fort. The armour was never fitted but one of the holes was used to bring a submarine telephone cable into the fort. There was a small penstock chamber on the extreme right of the passage. The penstock controlling the flow of waste water from the fort, seems never to have been fitted.

The other basement door opens into the magazine and appears to have been used only for loading ammunition into the magazine. The normal entrance (which is no longer used) was by the steps next to the officer's latrine and through a shifting lobby where the magazine workers changed into special ammunition clothing, a measure meant to prevent combustible material entering the magazine. Beyond a rope curtain lay the cartridge store. Illumination was from an overhead light passage at mezzanine level, equipped with a small railway to service the oil lamps.

Roof Level

A cast iron staircase leads from courtyard to roof, where the only original features were the lighthouse, ventilators and chimneys. On either side of the stairs were lookout positions, which were replaced in 1898 by

position finding cells, a Battery Commander's post and a submarine minefield directing station. Two emplacements for quick-firing guns were built here. The gun positions remain but the accessory works were demolished in 1906-7 when the 6-inch guns were installed. One 6-inch emplacement was later protected against air attack. The large building on the roof is the old battery observation post. The lighthouse, which dates from 1938, stands above. A loading gantry is suspended over the entrance door to the fort. Part of the traveller is still there but the hand-operated winch is missing.

Searchlights

Searchlights (also known as Defence Electric Lights) were first fitted in 1899. One light was housed in a small custom-made building next to the soldiers' latrine outside the fort. This was reached by a rather precarious walkway. The other light was inside the fort and shone through embrasure G3. Two Crossley 25 horsepower oil engines with belt-driven dynamos were installed by a Portsmouth contractor, Mr W. Wigginton. These emplacements were superseded by the existing ones in 1906-7. A third engine is believed to have been added then. In 1941 all three were replaced with Lister diesel generators, three of 22 kilowatt for the searchlights and one of 12 kilowatt for domestic use. The fuel was stored in five sixty-gallon tanks above the engine, with a reserve of twelve six-hundred gallon tanks. Three 90 centimetre projectors were installed - No.1 in the lower fighting light position, No.2 in the upper and No.3 in old gun position No.4.

Complement

The peacetime complement allocated in the 1891 RE records is one officer and twenty six other ranks consisting of two staff sergeants, and twenty-four gunners. Hammock hooks to accommodate 131 men in addition were fixed in the gallery and barrack rooms. In 1931, 154 Battery (Territorial Army) was allocated to the fort - three officers and thirty two other ranks. There was one Battery Commander, one relief Battery Commander and one Section Commander, five range-finding and instrument specialists, two telephonists, one Battery Commander's assistant, nineteen detachments for the guns, one gun storeman and four detachments for anti-aircraft light machine guns.

Life on Spit Bank Fort during the Second World War

When war broke out, the fort was manned by 154 Battery, Royal Artillery, a Territorial Army unit made up of local men. Conditions during the first year were rough. The winter of 1939-40 was unusually cold. The fort gradually filled up with conscripts, adding to the discomfort. Coal was brought on barges and had to be hauled on to the fort. All non-essential men were employed in this unpopular task. In October 1940, 154 Battery became 123 Battery, 529 Coast Artillery Regiment. The fort's role was to command the area behind Horse Sand and No Man's Land and to monitor shipping movements. All vessels had to display the "Lights of the Day" and at night searchlights were trained on any ship not carrying this signal. The watch was stationed in the Battery Observation Post where there was a small switchboard and telephone links to Fire Control Headquarters and the other forts, as well as alarm bells to summon gun crews if need be. The searchlight control switches were also here.

Watch was kept for enemy aircraft, which might parachute magnetic or acoustic mines into the sea. Minesweepers were constantly patrolling the Solent but a number of ships were lost - including some minesweepers. The Portsdown, a Southern Railway steamer, was mined a few hundred yards from Spit Bank Fort. During the blitz, the batteries near the Square Tower and Southsea Castle were damaged, putting the guns out of action and killing some men. The sea forts were not hit. One danger was falling shrapnel from nearby anti-aircraft guns, particularly those on Gilkicker Point.

A barrack block was built in the courtyard in 1941, slightly improving living conditions for the eighty or so men then stationed on the fort. It was difficult to relieve the forts in really bad weather and leave could be delayed. The old Gosport-Portsmouth ferries, small exposed boats, were used. In summer, swimming was allowed round the fort, with a whaler or cutter alongside for safety - the currents can easily sweep a man out to sea. Otherwise exercise was limited to running round the top of the fort and occasional cross-country runs on the Isle of Wight. An understanding N.C.O. might permit special exercises in a pub in Ryde!

Spit Bank Fort Armament Record

The armament return for 1886 shows that fort was equipped with nine 10-inch eighteen ton R.M.L. guns on the seaward side, with six 7-inch seven-ton R.M.L. guns facing the land. Two turrets would be fitted to the roof equipped with two 12-inch thirty-five ton guns each. In 1891 the fort is shown as armed with nine 12.5-inch thirty-eight ton guns in place of the 10-inch guns in the armoured portion with four 7-inch guns in the masonry portion. A committee under a Col. Montgomery recommended that the old R.M.L. armament be declared obsolete as they had a slow rate of fire and were expensive to man. Consequently, all the 7-inch and all but two of the 12.5-inch guns were removed in 1898, leaving two as 'Running Past' guns, which meant that they would only be fired as a vessel passed the fort. At the same time, two 4.7-inch quick-firing guns MkVI on Q.F.III mountings were fitted to the top of the fort and searchlights mounted to engage light torpedo boats attempting to enter Portsmouth harbour. The role of the fort now being to counter light craft rather than heavy warships.

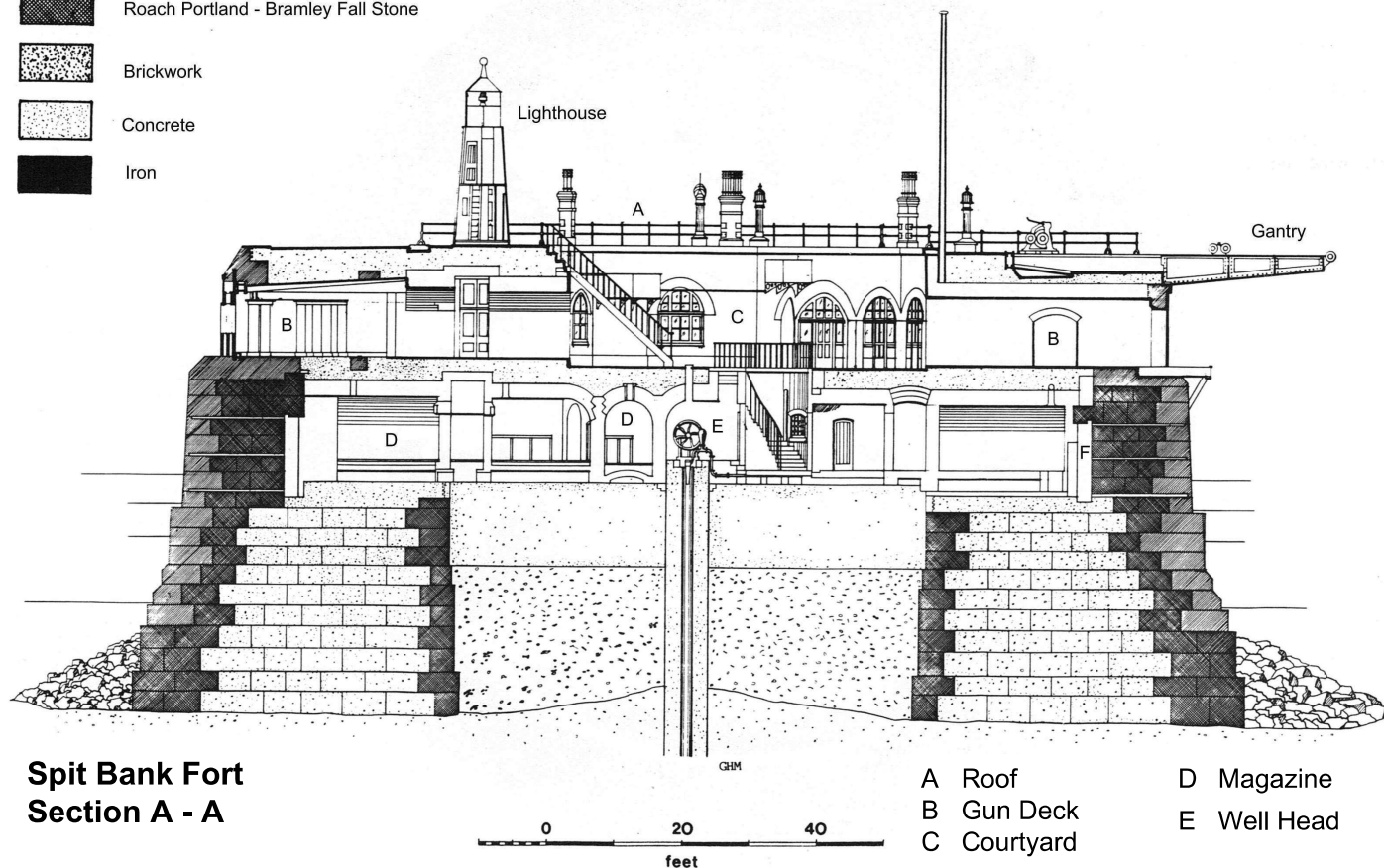
A further committee the 'Owen Committee' - made further alterations to the armament and two 6-inch MkVII breech-loading guns were mounted in 1905. These remained until 1916, when they were removed and sent to Scotland. The 4.7-inch guns were removed in 1921 but were refitted for station practice in 1926. A 6-inch B.L. gun was again fitted in 1931 and the 4.7-inch guns removed for the last time in 1938. During the Second World War, twin Lewis guns were fitted for Anti-aircraft use and a 40mm Bofors Light AA gun was mounted in 1943 but removed in 1945. The 6-inch gun was taken off the fort in 1948. Coast artillery was disbanded in 1956 and the searchlights and generators removed and sold the following year.

Spit Bank Fort Roof Plan 1878

- A Lighthouse
- B Lookout Gallery
- C Air outlet from Light Passage
- D Air Inlet to Basement
- E Air Outlet from Stores
- F Air Outlet from Magazine Store and Shifting Room
- G Flagstaff
- H Flue

Upon the shoal a solid annulus of masonry 48ft thick was constructed. The exterior rings to a height of 15ft are of Bramley Fall and Runcorn or Portland stone, and the intervening space is filled in with concrete blocks weighing about 8 tons each. In January 1868 a difference of level of 3in in the top bed of the sixth course in an E.S.E. direction was noticed. This was corrected in the eight course.

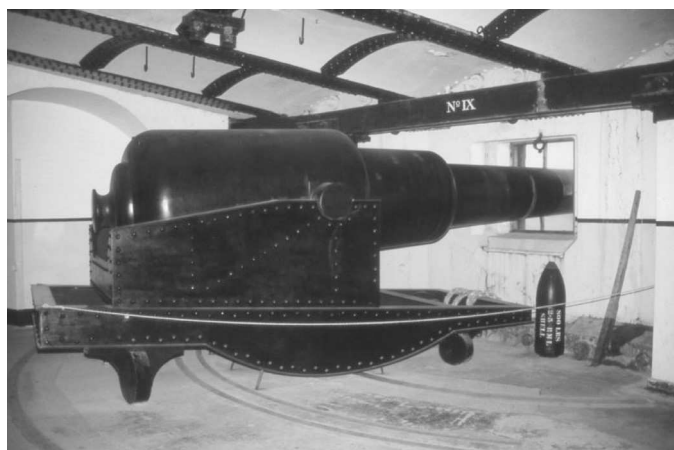
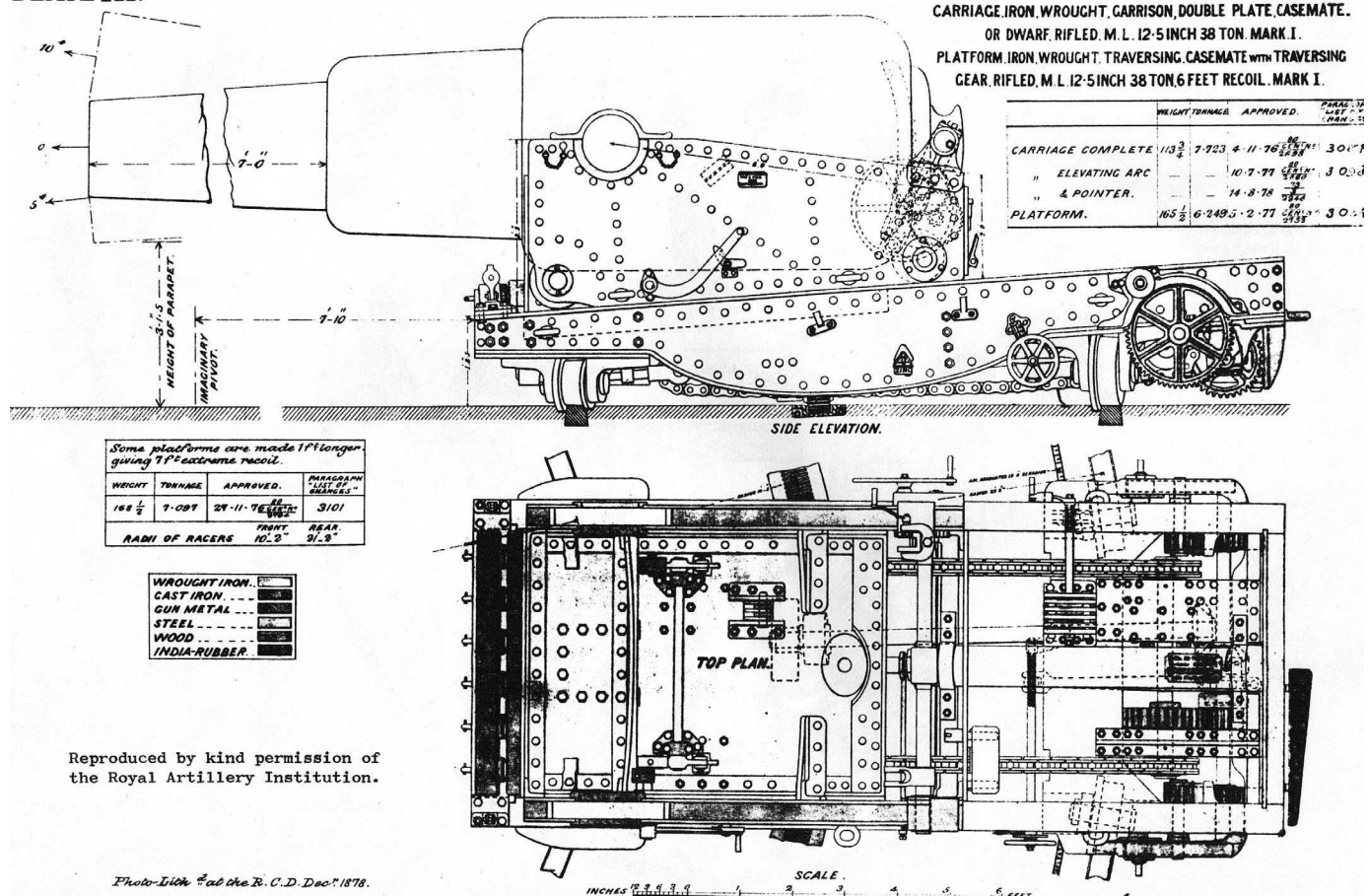
- Granite
- Roach Portland - Bramley Fall Stone
- Brickwork
- Concrete
- Iron



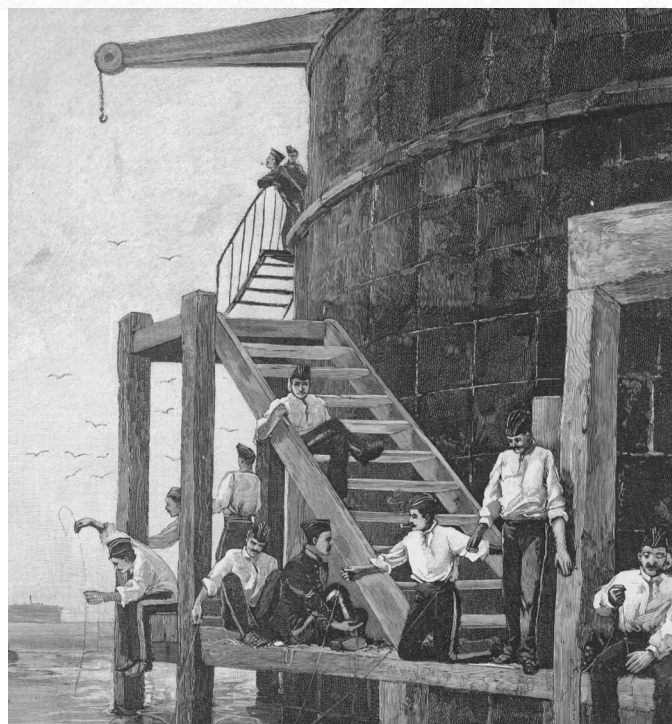
**Spit Bank Fort
Section A - A**

- A Roof
- B Gun Deck
- C Courtyard
- D Magazine
- E Well Head

PLATE 141.



A replica 12.5inch R.M.L. mounted in Spit Bank Fort by Shaun Maguire when he opened the fort as a tourist attraction. It has now been removed.



'Soldiers Fishing from One of the Spithead Forts'

Black & White Magazine July 23 1892

Plate IV.

CARRIAGE, GARRISON R.M.L. 7 S. PLATE CASEMATE OR DWARF.
SLIDE, L, R.M.L. 7 CASEMATE. S. PLATE.

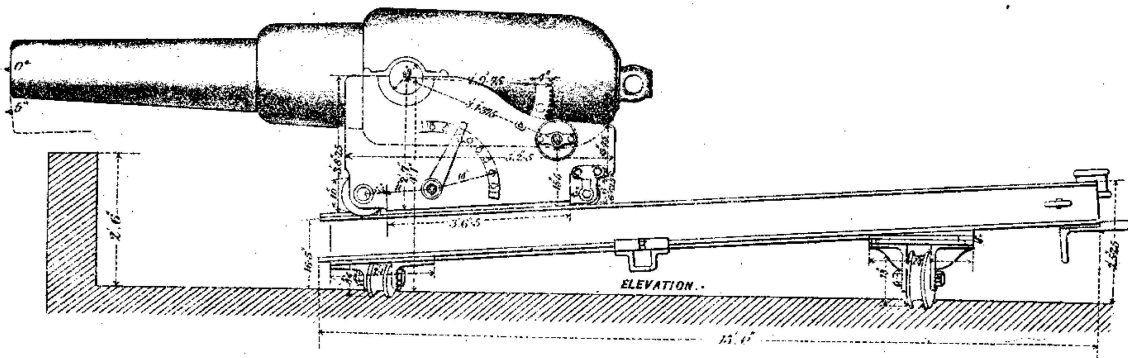
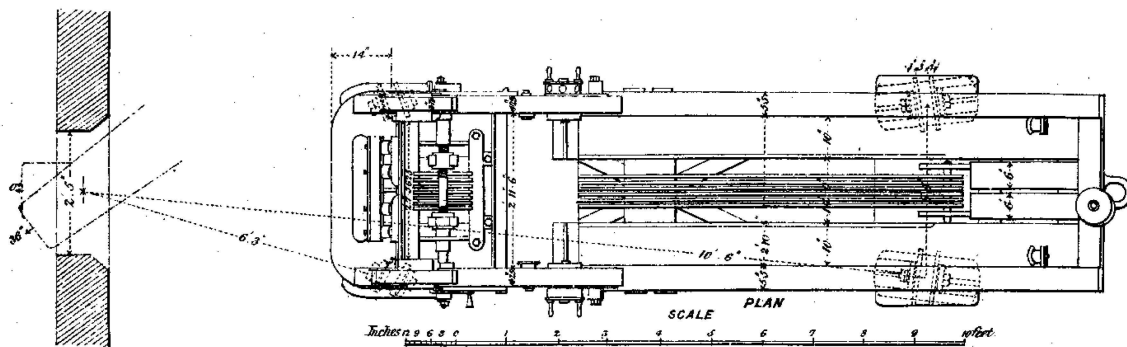


Plate X.

SLIDE, L, R. M. L 7 CASEMATE S. PLATE



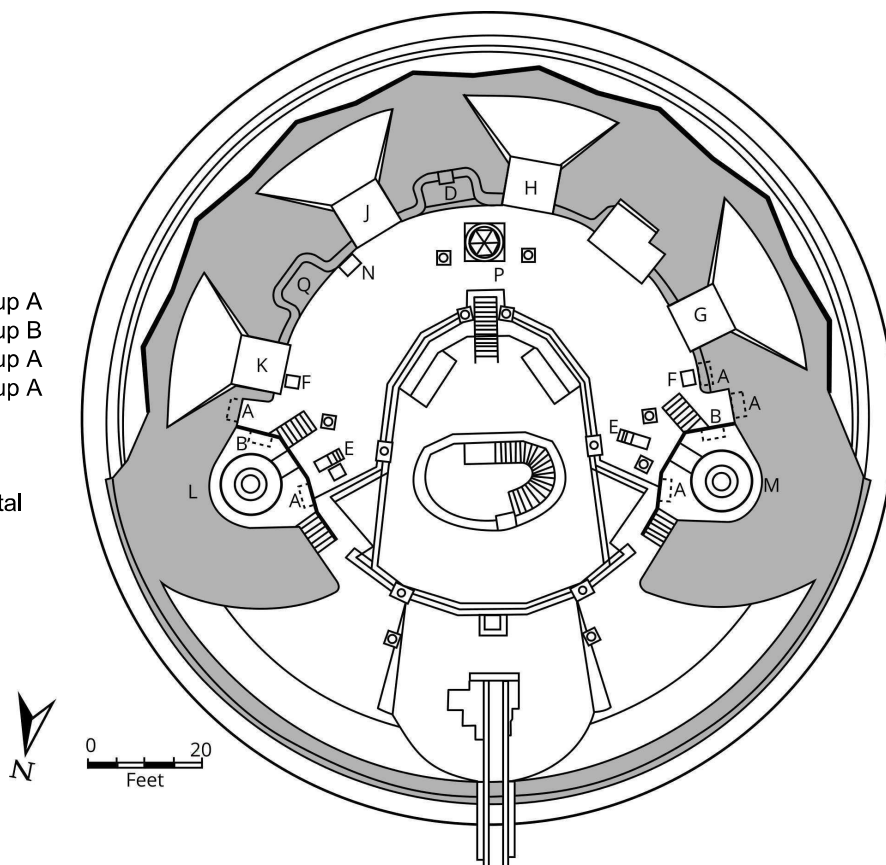
Spit Bank Fort: Gun Embrasure for 12.5inch R.M.L. in 2010



Spit Bank Fort: Gun Embrasure in 2012 after conversion to modern use

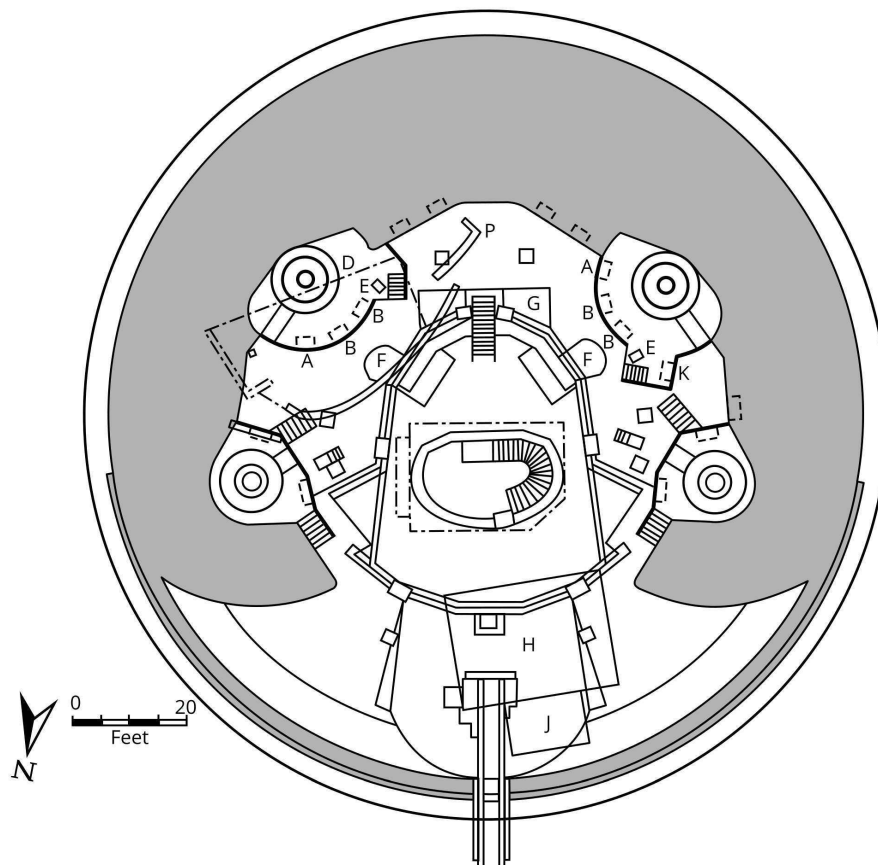
Spit Bank Fort Roof Plan 1898-1907

- A Cartridge Recess
- B Shell Recess
- C Submarine Directing Station
- D B.C. Post
- E Shell Lift
- F Cartridge Lift
- G Position Finding Station Gun Group A
- H Position Finding Station Gun Group B
- J Position Finding Station Gun Group A
- K Position Finding Station Gun Group A
- L 4.7-inch gun position Q/1
- M 4.7-inch gun position Q/2
- N Telephone Room
- P Depression Range Finder Pedestal

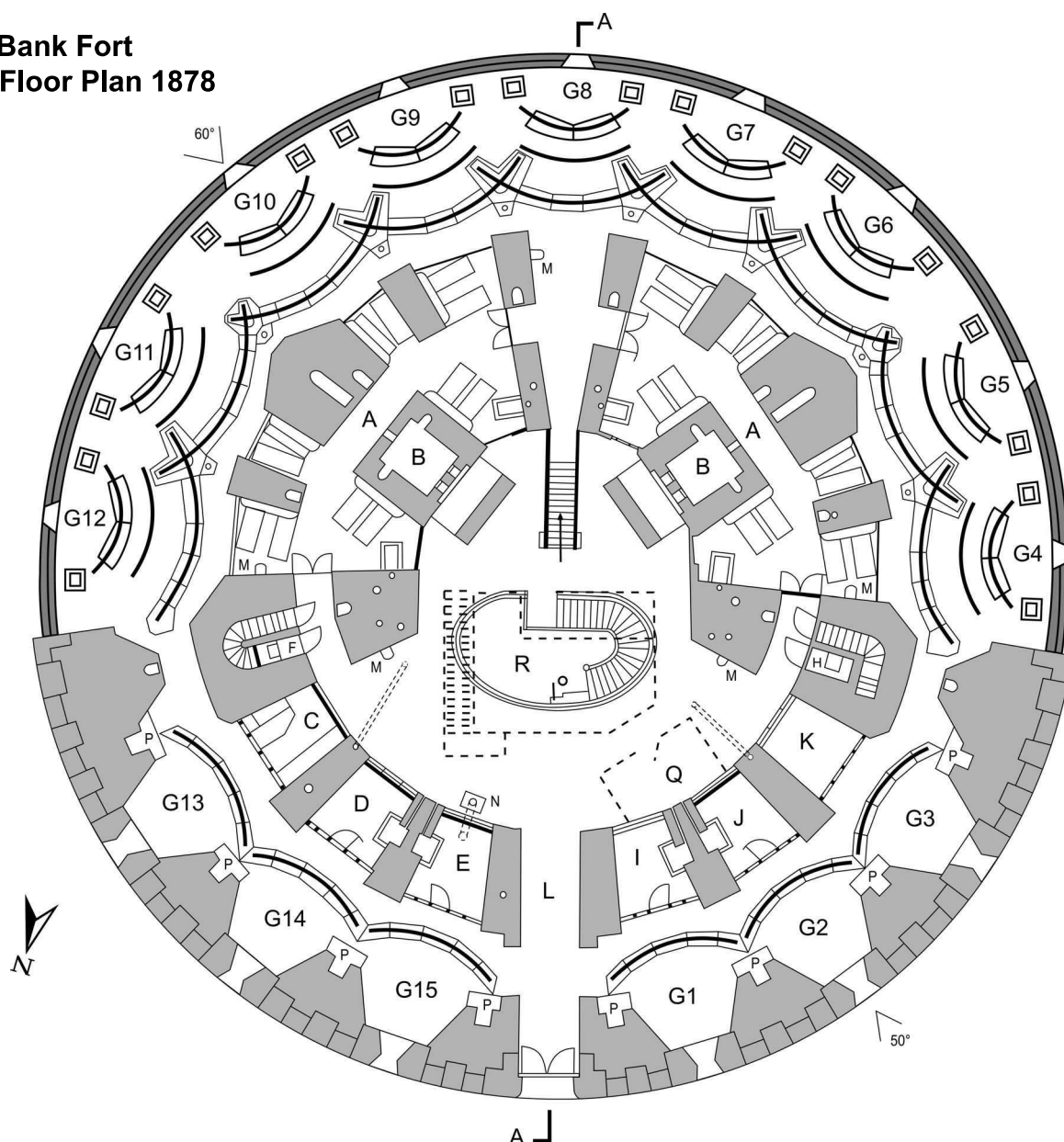


Spit Bank Fort Roof Plan 1907

- A Cartridge Recess
- B Shell Recess
- C 6-inch B.L. Position B/1
- D 6-inch B.L. Position B/2
- E Shell Lift
- F Cartridge Lift
- G Directing Station (to 1938)
- H Battery Observation Post (over)
- J Artillery Store
- K Stores Recess
- L 4.7-inch gun position H/1
- M 4.7-inch gun position A/1
- N Rear and Overhead Protection from 1940
- P Site of Lighthouse



Spit Bank Fort Gun Floor Plan 1878



1878

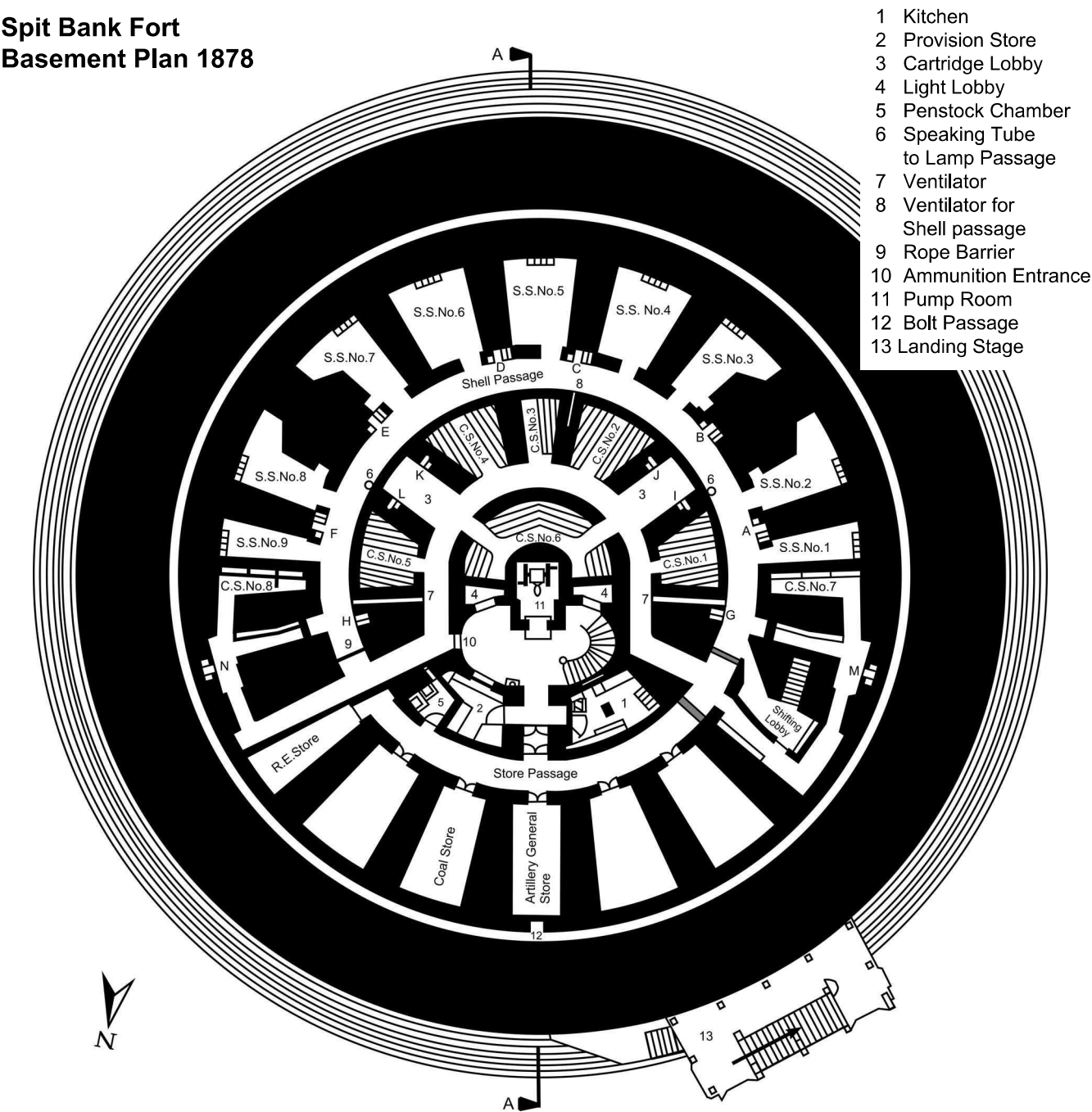
- A Soldiers' Room for 12 men
- B Powder Serving Room
- C Ablution Room
- D Staff Sergeant's Quarters
- E Guard Room
- F Urinal & Night Latrine
- G Gun Position
- H Officer's Latrine
- I Officer's Servant's Quarter
- J Officer's Quarter
- K Laboratory & Shifting Room
- L Entrance
- M Stand Pipe
- O Derrick
- P Shell Recess

1942

- G2 Engine Room
- G4 No.3 Emplacement
- G5 Oil Store
- G6 Old Canteen
- G7 Defence Electric Light
- G8 Gunners' Dining Room
- G9 Battery Observation Post
- G10 Shell Store
- G11 Canteen
- G13 Sergeants' Mess
- G14 Officers' Mess
- G15 Blacksmith's Shop
- D Battery Office
- E Officers' Cookhouse
- Q Ration Store
- R Gunners' Block



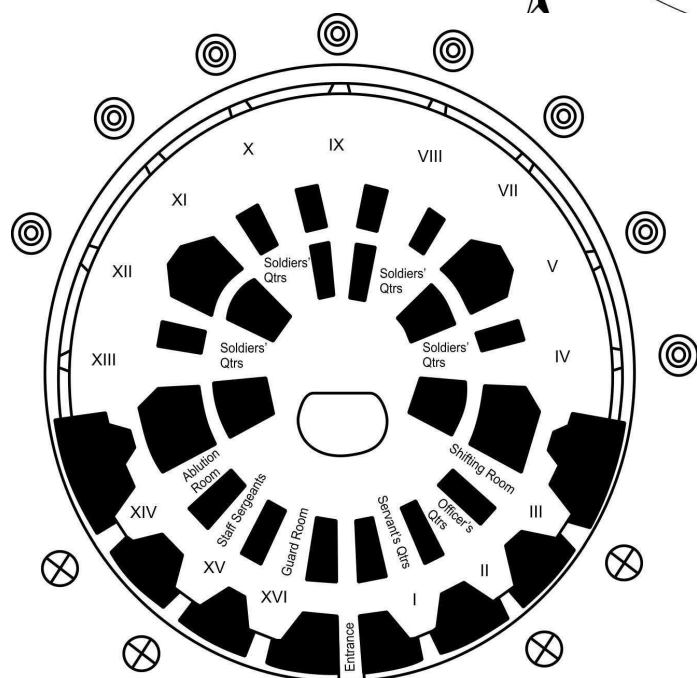
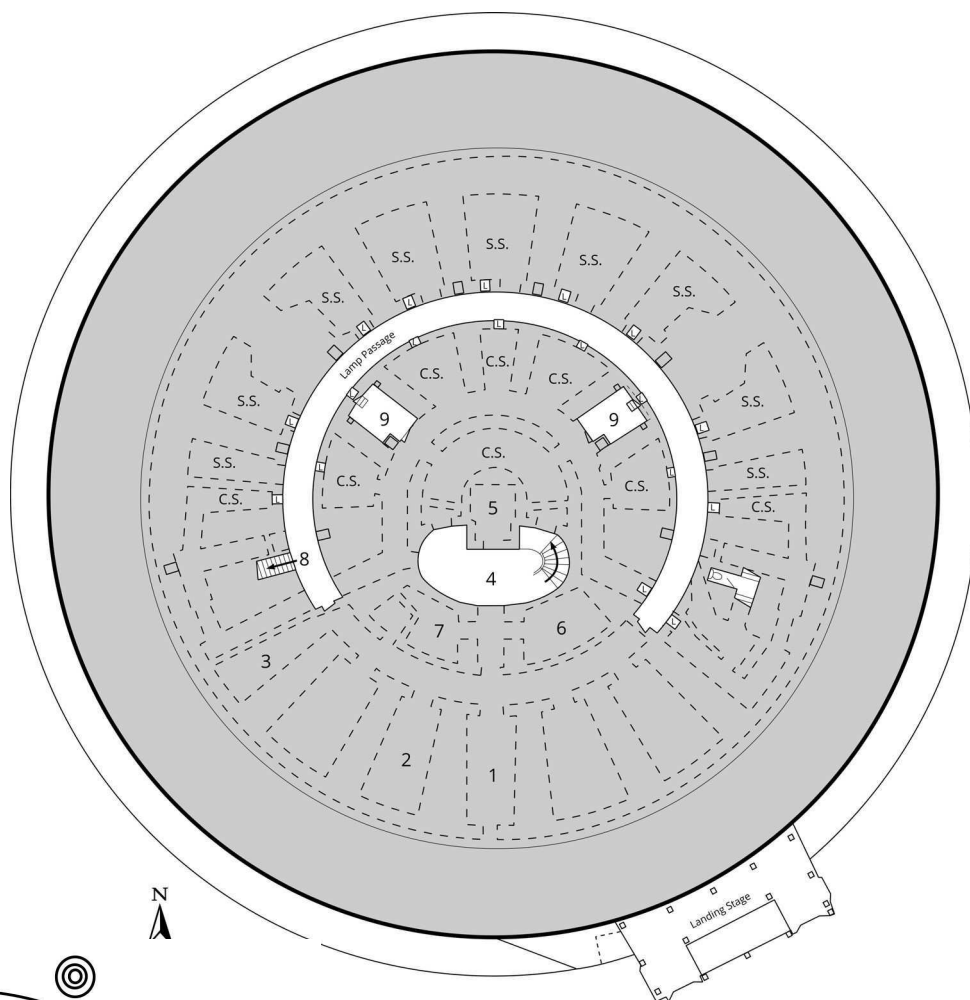
Spit Bank Fort
Basement Plan 1878



Shell Stores		Cartridge Stores		Shell Lifts		Cartridge Lifts	
S.S.	For Guns	C.S.	For Guns		For Guns		For Guns
No. 1	1, 2 & 3	No. 1	4 & 5	A	4 & 5	I	4 & 5
2	4 & 5	2	6 & 7	B	6	J	6, 7 & 8
3	6	3	8	C	7 & 8	K	9 & 10
4	7	4	9 & 10	D	9	L	11 & 12
5	8	5	11 & 12	E	10	M	1, 2 & 3
6	9	6	4 to 12	F	11 & 12	N	13, 14 & 15
7	10	7	1, 2 & 3	G	1, 2 & 3		
8	11 & 12	8	13, 14 & 15	H	13, 14 & 15		
9	13, 14 & 15						

Spit Bank Fort Lamp Passage Level

- 1 Entrance to Bolt Passage
- 2 Coal Store
- 3 R.E.Store
- 4 Entrance to magazines
- 5 Well
- 6 Kitchen
- 7 Pantry
- 8 Entrance to Lamp Passage
- 9 Cartridge Handling Room
- L Lamp recess
- C.S. Catridge Store
- S.S. Shell Store

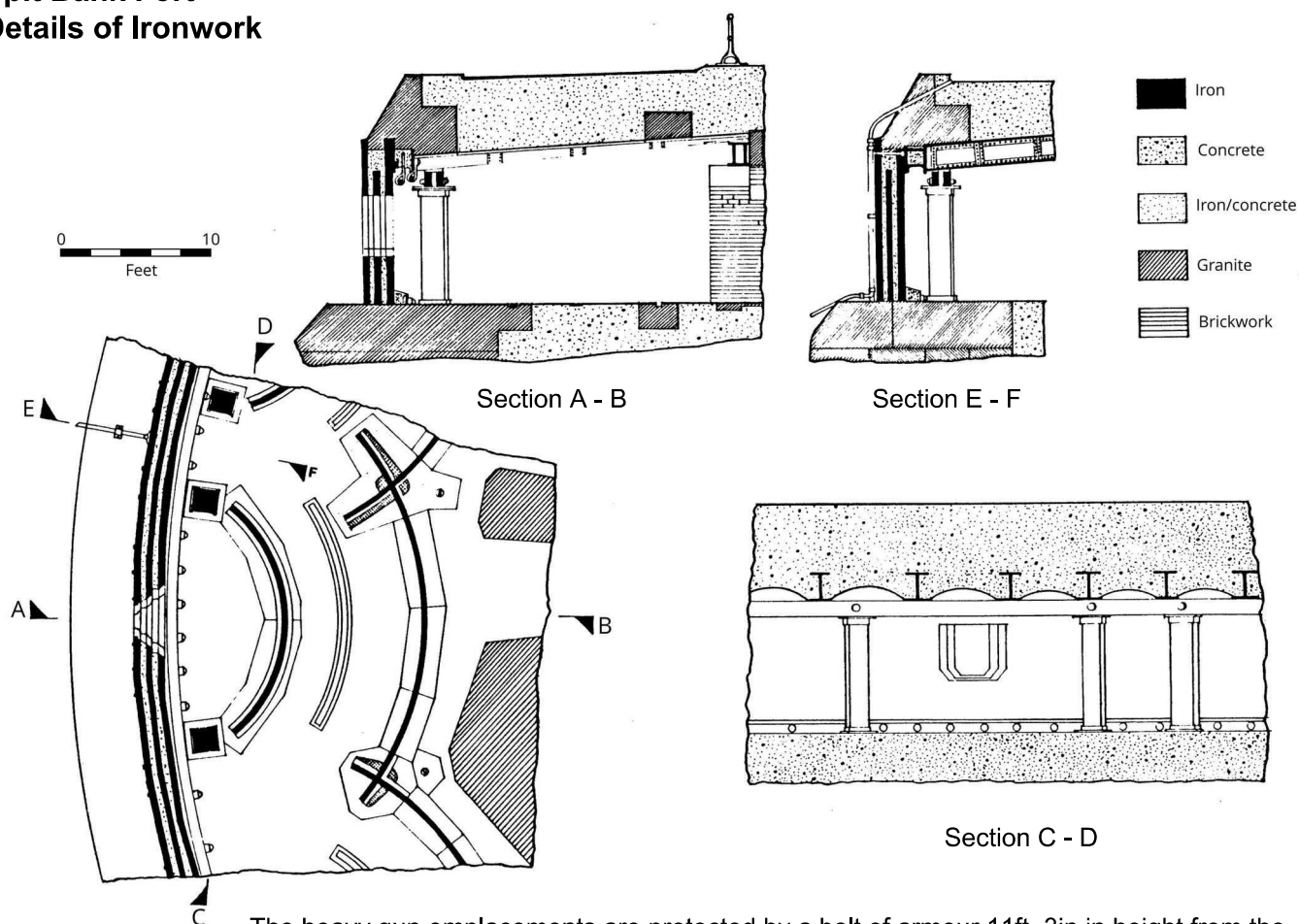


Spit Bank Fort
Armament Plan 1891
4 x 7-inch 7-ton R.M.L. guns
8 x 12.5-inch 38-ton R.M.L. guns



Spit Bank Fort

Details of Ironwork

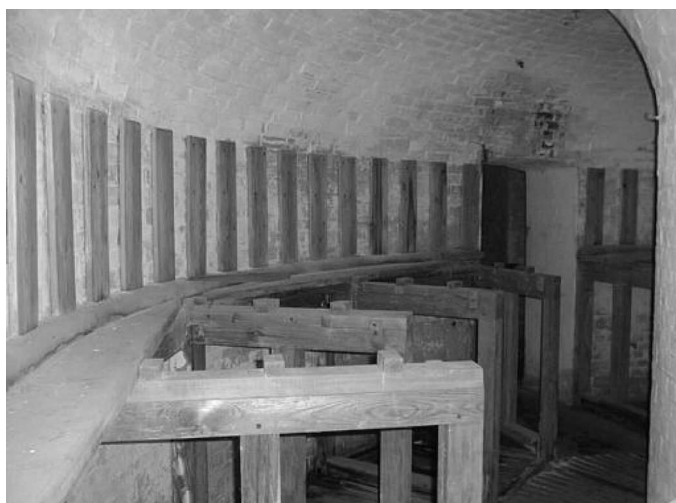


Plan

The heavy gun emplacements are protected by a belt of armour 11ft. 3in in height from the level of the floor of the gun battery. The armour surrounding the ports is made up as follows from the outside: 5in wrought-iron, 1in teak, 2inch wrought iron, 1in teak, 5in wrought-iron, then similar plates in reverse order. Elsewhere the armour consists of three 5in wrought-iron plates separated by 5in layers of concrete. Two of the masonry piers on the sea face were designed for the support of turrets and are larger than the remaining piers but the idea of the turrets having been abandoned these piers were not used as originally intended.



Spit Bank Fort: The courtyard in 2009



Spit Bank Fort: Cartridge Store



Spit Bank Fort: The Courtyard in 2003

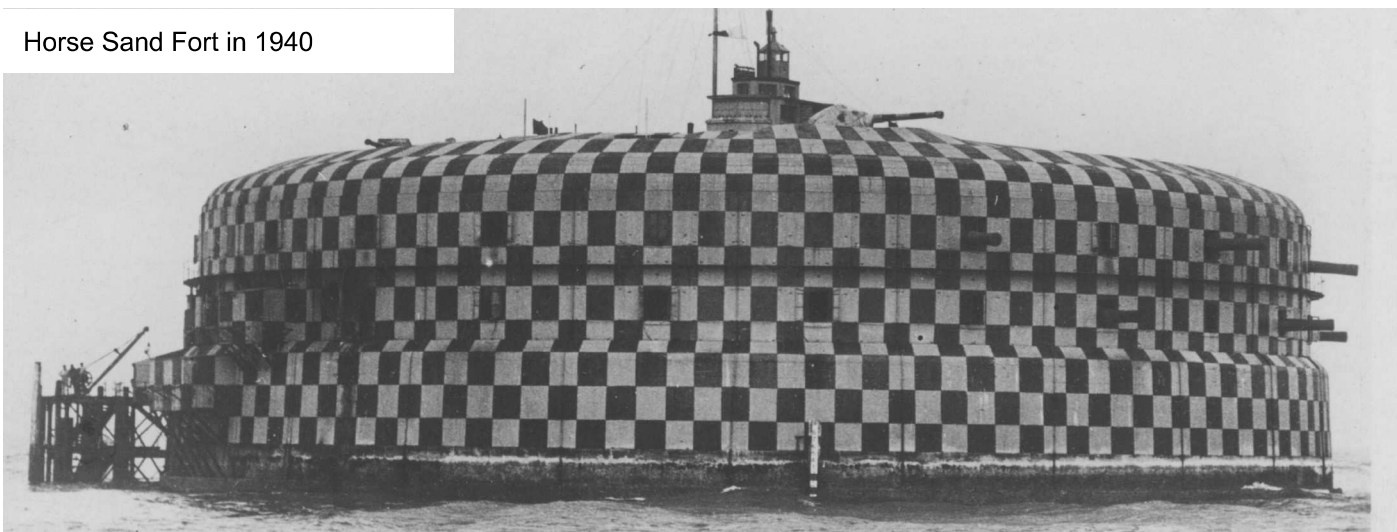


One of the Spithead Forts during World War Two

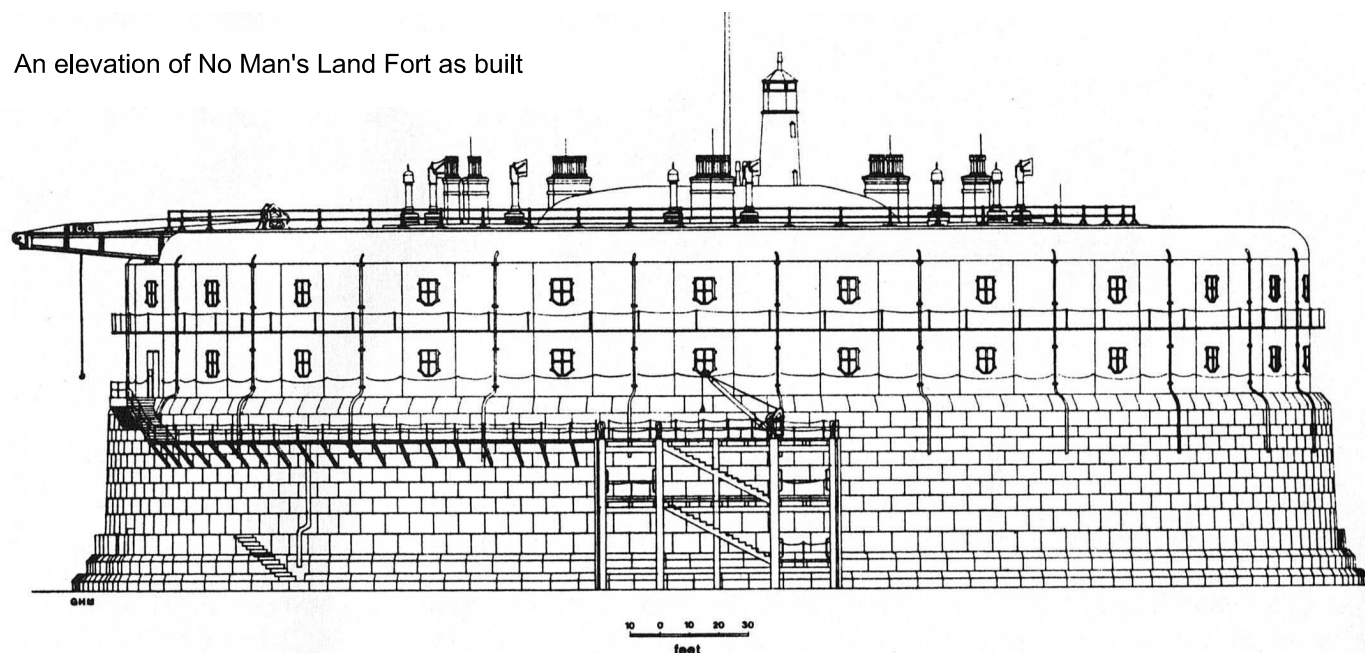


Spit Bank Fort: A gun casemate in 2009

Horse Sand Fort in 1940



An elevation of No Man's Land Fort as built



Description of Horse Sand and No Man's Land Forts

These two almost identical forts, half as large again as Spit Bank, have two gun floors and are armoured round their whole circumference, with provision for five roof turrets. Otherwise they are very like Spit Bank, even down to shell lifts, ventilation and internal fittings. The armour is laminated but hung on vertical iron members and supported by triangular pillars - instead of square columns - between the gun ports. Instead of a courtyard, there is a central core separated from the outer ring by a roofless passage fourteen feet wide. The roofs of both forts were modified for modern armament shortly after the turn of the century.

Basement

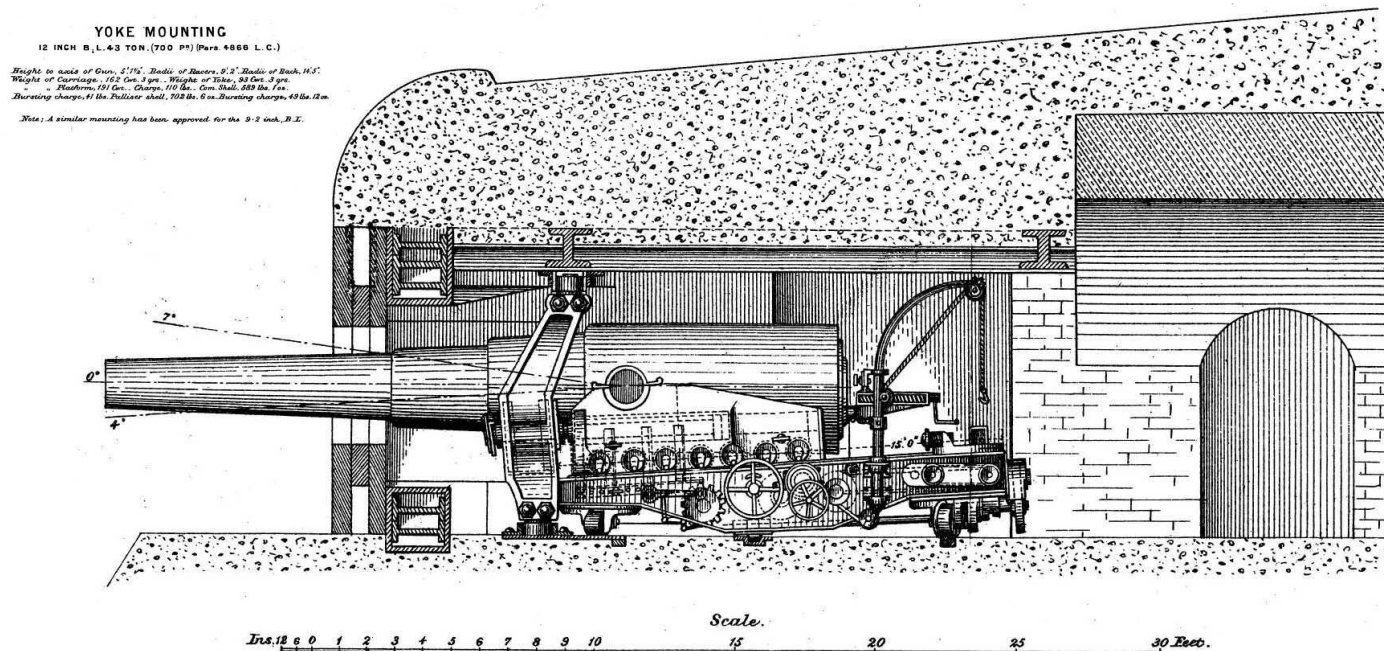
The basement contains the magazine. Twenty-four shell stores and lifts open off the outer passage, fourteen cartridge stores and lobbies off the middle one, both reached by a circular staircase and shifting lobby. A straight staircase led down the central core to a laundry, cookhouse, washroom and coal store. The magazine was lit by a light passage above the outer passage, the central core by skylights in the floor of the roofless passage. A chamber off the outer passage opened on to a bolt passage, which allowed armour to be fastened to the exterior wall. This chamber also gave access to a cable cut, by which electric cables could be connected to the controlled minefield between the two forts.

The outer ring of shell stores was later blocked with concrete and the bolt passage with sand to protect the

magazine. The central core was altered to accommodate steam boilers, an hydraulic pump and accumulator for powering the armament.

Gun Floors

The lower floor had positions for twenty-four heavy guns on traversing slide carriages, with separate ammunition hoists for shells and cartridges. The emplacements were designed for 10-inch guns but some were soon changed for 12.5-inch R.M.L. guns then more powerful 12-inch breech-loaders. The entrance is on this floor and is closed by a two-leaf iron door, which could be reinforced with a thirty-four ton sand-filled armoured box, four-wheeled and running on rails. The central core was divided into five officers' quarters and the officers' mess. The upper floor had twenty-five gun positions and peacetime quarters for seventy-two soldiers. These quarters were separated from the gun gallery by roller shutters. A trapdoor in the floor over the entrance allowed guns to be hauled up, using the hand winch on the roof via a small access hatch. Even with the winch, raising guns was hard work. On this floor the central core had only the lighthouse keepers' quarters and the water cisterns. Both floors were much modified during the First World War, most of the guns having already been removed. The gun galleries were divided into officers' and soldiers' quarters, dining rooms, generator and oil storage rooms, a NAAFI canteen and additional washrooms and toilets. The forts had their own wells and generated their own electricity. Only the telephone cables linked them with the shore.



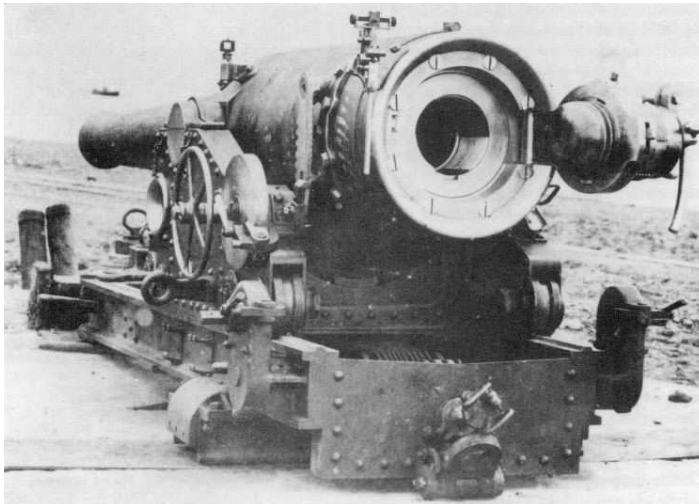
12-inch R.B.L. gun of 47 tons on yoke mounting, special for Spithead Forts. The gun and mounting with yoke weighed 70 tons. It was fired with satisfactory results during trials at Horse Sand Fort in December 1885.

Roof Level

Originally the roof held only the lighthouse, ventilators and chimneys. There was no armament apart from the provision for turrets. Both forts were fitted with position-finding stations toward the end of the century but by 1909 these had been removed along with most of the obsolete 12.5-inch guns. The roof was adapted for three 6-inch breech-loading guns and associated shell recesses. The position-finding equipment for the new guns was concentrated in the central core in a building which was extended to provide a fire control position, a Battery Commander's post and (in Horse Sand Fort) a naval signal station. At the start of the Second World War, the Command post was raised up one floor to give a better view over the guns. The signal station on Horse Sand acquired a distinctly nautical flavour with the addition of a mast, yard and flag locker. Both forts were equipped with AA searchlights and for brief periods with anti-aircraft guns, mostly for local defence. The roof can be reached from the upper gun floor by three trapdoors and by circular staircases in the middle of the central cores. The loading gantry, with hand operated winch, is at the back of each fort. Behind the winch was an access hole allowing gun barrels to be hauled from the lower to the upper gun floor. Horse Sand and No Man's Land forts are not open to the public.

Horse Sand and No Man's Land Fort Armament

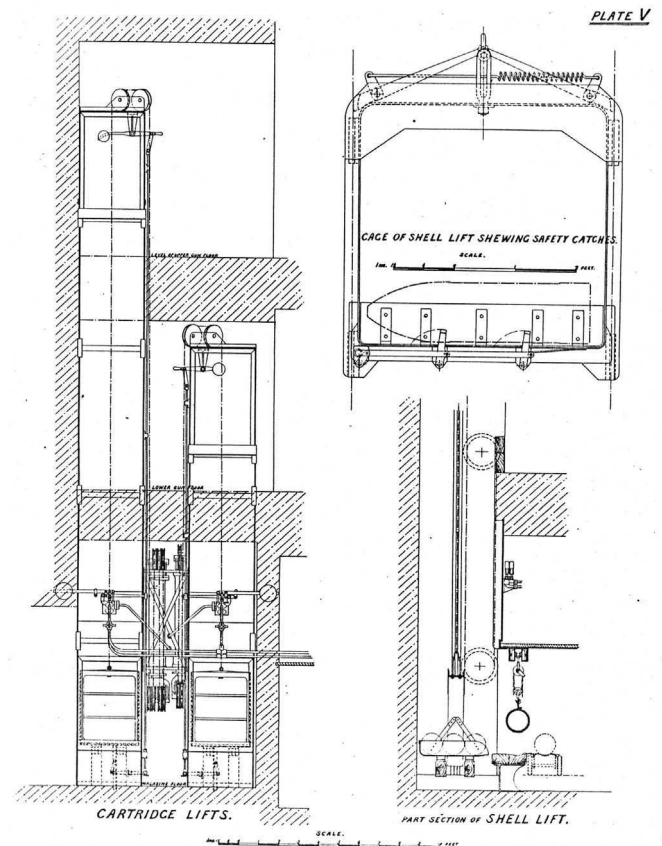
The original armament for the outer forts was to have been forty-five 10-inch and forty-four 12.5-inch R.M.L. guns with ten 12-inch thirty-five ton R.M.L. guns on the roof, in five turrets. The turrets were not fitted for financial reasons and the casemate armament was much reduced. The casemates were cramped and the 12.5-inch gun was fitted to a shorter Casemate II Special A 6ft mounting to accommodate it. This meant that a full charge of powder could not be used and reduced the muzzle velocity of the gun and its ability to penetrate armour. This was not satisfactory and further work was put in hand to find an alternative. By 1882, a 12-inch forty seven ton breech loading gun was available and one was tested at Horse Sand Fort in December 1885. By 1895 12-inch B.L.s were fitted in alternate casemates on the seaward side of both Horse Sand and No Man's Land Forts, on special yoke mountings to spread the live load to floor and roof. At the same time, the outer rings of magazines were filled in with concrete to give greater stability and the bolt passage blocked with sand. Plans were made to fit an even larger weapon, a 12.1-inch fifty ton breech-loading gun but there was not enough room in the casemate and it was abandoned.



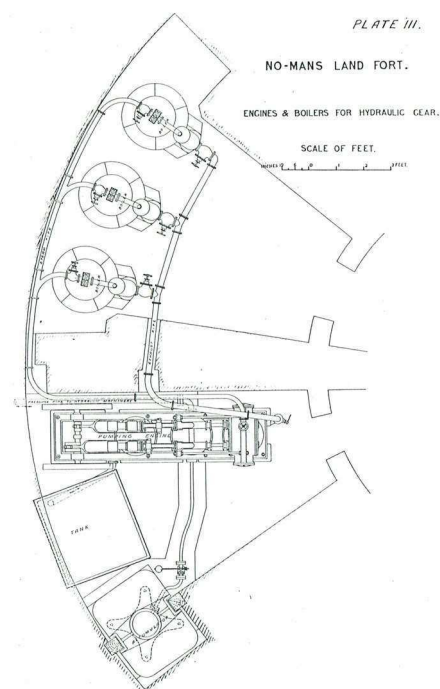
A 12-inch B.L. of 43 Tons at Shoeburyness for trials.

Quick-firing guns were required to counter the threat from light craft and by 1893 6-pounder 8cwt Nordenfolt guns were mounted, twelve on each gun deck, on special 'Casemate Saddle Mountings', which enabled the gun to fire through an embrasure yet allowed it to be swung back inside the fort when not in use. They were removed in 1902. Arguments continued as to the effectiveness of the forts and investigations were made into replacing them with towers four hundred yards east of Horse Sand Fort and a similar distance south of No Man's Land Fort. Turrets containing 17-inch one-hundred ton guns were planned but the whole cost came to £672,000. Even when the turrets were replaced with barbette mountings, the cost was estimated to total £388,000. Unsurprisingly, the project was shelved. Plans to add armour to the forts at a cost of £57,000 each were also not proceeded with, yet the rearmament of the forts was estimated to cost £376,000.

The 12-inch B.L. gun was really too big to manoeuvre by hand, needed too many men and was slow to traverse. Col. Maguire-Bate, Inspector of Iron Structures 1889-1895, supervised the installation of hydraulic machinery to operate the mountings. Basement boilers with hydraulic pumps and accumulator, delivered water at 700lbs pressure. Now hydraulic power traversed and elevated the mountings, opened and closed the breech mechanism and loaded and rammed home the shells and charges. Hydraulic lifts, with multiple pulleys raised cartridge and shells from the magazine to the gun floors. The ammunition for the 12.5-inch guns was raised by power to the barrels but the rest of the actions remained manual. When position-finding cells were placed on the roof, it was claimed that the guns could be operated



Col. Maguire-Bate's designs for Hydraulic Machinery for 12-inch B.L. guns installed in Horse Sand Fort



from there under power control, the first in Europe it was believed, to do so. Hydraulic power was also used to move the armoured door, with its thirty-four tons of dead weight. Electric lighting was fitted to magazines and stores at this time. As with the other forts, most of the R.M.L. guns were removed leaving two to be used as 'Running Past' guns. A 4.7-inch Q.F. IV B gun on Q.F.III mounting was fitted to No Man's Land fort in 1902. In three casemates on Horse Sand, the triangular supports were cut away behind the embrasures to increase the traverse to 88 degrees for mounting 6-inch breech-loaders. These were proposed in 1901 and by 1906 one 6-inch B.L.VII on a casemate mounting was fitted on the upper deck of Horse Sand Fort, on a special electrically operated mounting as an experiment. Similar work was carried out at No Man's Land Fort. They were not a success and were taken out by 1907. The 6-inch Mk VII breech loading gun however - on central pivot mountings - became the standard coast artillery weapon. Three emplacements were provided for them on the roof of each fort.

In 1904 the 10-inch R.M.L. guns were removed. In 1905, the Owen Committee's recommendations made the 12.5-inch R.M.L. armament redundant. Shore-based 9.2-inch guns, mostly on the Isle of Wight, were set up to repel warships. The forts were now expected to stop smaller vessels entering the harbour. About this time a line of concrete blocks was laid from Southsea beach to Horse Sand Fort. These were provided to prevent an enemy from attempting to block Portsmouth harbour with a blockship (as the Royal Navy did at Zeebrugge during the First World War, when the Vindictive was sunk across the harbour mouth to prevent it being used by U-boats). Two 12.5inch guns were retained in each fort as 'Running Past' guns. In 1907 six of the 12-inch B.L. guns on each fort were put in reserve.

The 1905 armament list shows:

Horse Sand Fort Top

Nil

Horse Sand Fort Upper Tier

5 x 12-inch B.L.

1 x 6-inch B.L. VII on Casemate I

9 x 6pdr Nordenfelt on R.C.S.

(Recoil Carriage Saddle)

Horse Sand Fort Lower Tier

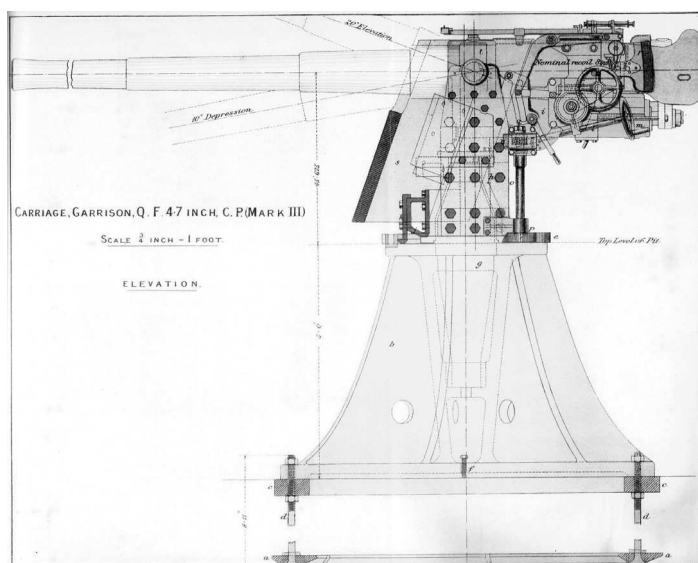
5 x 12-inch B.L.

2 x 12.5-inch R.M.L. on Casemate III special A 6ft

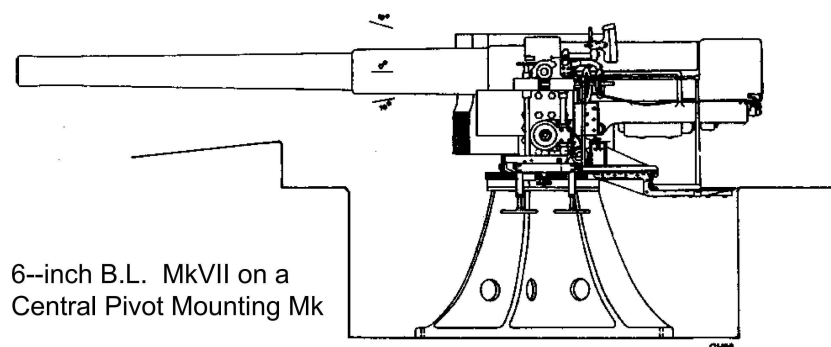
11 x 6pdr Nordenfelt on R.C.S.



Delivering a 4.7-inch Q.F. gun to Horse Sand Fort
(Illustrated London News December 13 1902)



4.7-inch Quick Fire Mk IV on Centre Pivot MkIII



6--inch B.L. MkVII on a
Central Pivot Mounting Mk

men in peace time with hammocks for a further 207 men on Horse Sand and 199 on No Man's Land after mobilisation.

In 1915 St Helen's Road became the Spithead examination anchorage for the searching of suspicious vessels under the guns of a battery. Until a 4.7-inch Q.F. gun was emplaced at Nodes Point Battery in 1918, St Helen's Fort was reactivated to serve as examination battery. Work costing £489 was carried out by January 1916 to

install two 12-pounder Q.F. guns on the roof and two searchlights in temporary emplacements of corrugated iron. These covered the approaches to Spithead and also worked for the guns of Nodes Point and Culver batteries. One searchlight emplacement was built in front of the 12.5-inch embrasure in front of the emplacement. Any vessel approaching Spithead would pass through its narrow beam and alert all the guns in the area. The directing officer was situated in the battery command post built around the base of the light tower on the roof. The engine room for a paraffin engine was converted from the 10-inch shell store left opposite. Later the engine room was shifted to the 12.5-inch emplacement. The officers' quarters were in the old barrack rooms immediately above while the other ranks slept in the old 10-inch R.M.L. emplacements. The gunners probably came from No.32 Company R.A. at Nodes Point.

The 12-pounder Q.F. guns were dismounted in September 1918 but were not removed until after a review of batteries in 1927. The fort was in 'care and maintenance' until the next war, with a caretaker and his family to tend the light. In 1926 the examination anchorage was moved to No Man's Land fort. In 1935 the two searchlight emplacements were reconstructed in



A 6-inch gun on Horse Sand Fort in 1940

No Man's Land Top

1 x 4.7-inch Q.F. IV on B on Q.F. III

No Man's Land Upper Tier

4 x 12-inch B.L.

9 x 6pdr Hotchkiss on R.C.S.

No Man's Land Lower Tier

4 x 12-inch B.L.

2 x 12.5-inch R.M.L. on Casemate III special A 6ft

11 x 6pdr Q.F. Hotchkiss on R.C.S.

By 1909, most of the 6-inch B.L. Mk VII guns on C.P. mountings were fitted on the roofs of the forts and the position finding instruments removed. Some six-pounders were replaced with twelve-pounders, some removed completely. The 12-inch B.L. guns were reduced to fifty rounds each. The 12.5-inch R.M.L.s were issued with only case shot for use against light craft. All were intended as 'fixed point' guns and consequently the hydraulic machinery was stripped out. In 1916, one 6-inch gun from each fort was sent to the east coast and Scotland, attack being more likely across the North sea than the channel. In 1921 the forts were place in 'Care and Maintenance'.

In 1925, all the remaining 12-inch guns were sold for scrap. Only two 6-inch guns were left, with a 3-inch Anti-aircraft gun on Horse Sand Fort. The severe shortage of AA guns meant that in 1941, this gun was removed and fitted to a merchant vessel. 40mm Bofors guns were fitted in 1943 and removed in 1945. In 1951, the 6-inch guns were removed from the forts. As with Spit Bank, the searchlights were sold and removed in 1957. It seems unlikely that all of the guns could be be fully manned in war time. A 12.5-inch gun needed twenty men, including reliefs, with a customary one third extra for ammunition duties. This would have meant thirteen hundred men. The larger forts each accommodated 5 officers (3 on No Man's Land) and 90

concrete with steel shutters. The fort was reactivated in autumn 1940, principally to provide searchlight illumination again for the Nodes and Culver batteries. In 1941 the paraffin engine was replaced by two 22kw and one 12kw Lister generating sets to two 90cm projectors. Initially the lights were directed by 'B' battery of 529 Coast Regiment RA (TA) at Nodes Point, although 527 Regiment took over responsibility for both places. A 40mm Bofors AA gun was installed in 1943 with an anti-shipping role. After the war this was soon removed but the searchlights were used in conjunction with 6-inch training of TA gunners at Nodes Point. When coast defence was closed down in 1956 all searchlight equipment was sold to H. P. Jolliffe of Cowes in December 1957. Today the fort is in private ownership and cannot be visited.



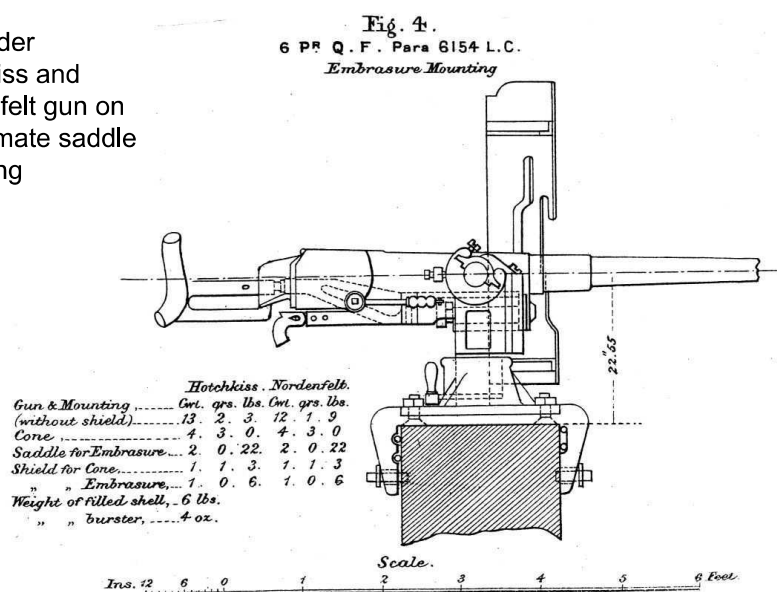
Horse Sand Fort: View across the roof in 1996

Conclusion by Garry Mitchell

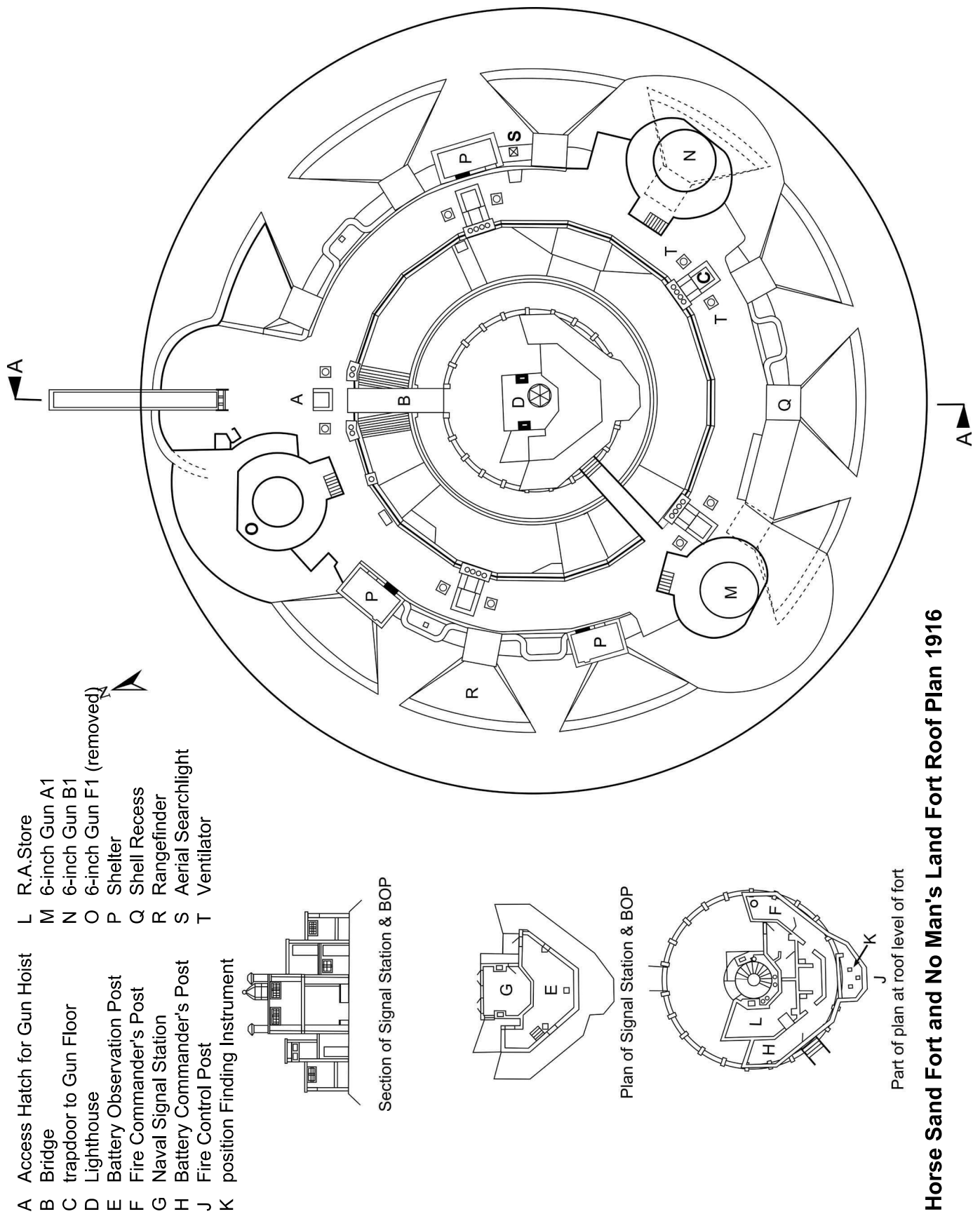
The cost of building the Spithead forts was estimated in 1862 to be £260,000 and £290,000 for Horse Sand and No Man's Land fort, respectively. The smaller forts had been deleted and were not included at this time. In 1867 the costs for the two larger forts had risen to £365,000 and £406,000. The actual costs were finally estimated to be £424,000 and £462,500. Spit Bank was to cost £167,300 and St Helen's £123,311. None of these figures included any armament and to arm all the forts as planned would have given a total cost of £1,763,864. There is no comparison possible with today's prices but the total UK Government expenditure in 1868 amounted to £75,000,000 and out of this the total army estimate was £15,000,000.

The sea forts were constructed to oppose a very real threat. They were a deterrent and a means of defending the naval base at a time when the Royal Navy was at its most vulnerable. We now know that Napoleon III* had no intention of invading England. This however is with the benefit of hindsight and perhaps he was deterred - we cannot say. If there is a justification in the name of 'Palmerston's follies' - a name these forts share with those on Portsdown - then it is in the lack of foresight shown in the design and location. Richard Cobden, liberal reformer and opponent of fortifications, said in a contemporary statement, that improvements in ballistics and metallurgy would render the forts useless in a short space of time. He was right but all weapons quickly become obsolete. We see this in our own time - so we must not be too harsh in our judgement of soldiers and politicians who were experiencing rapid change for the first time.

6-pounder
Hotchkiss and
Nordenfolt gun on
a casemate saddle
mounting

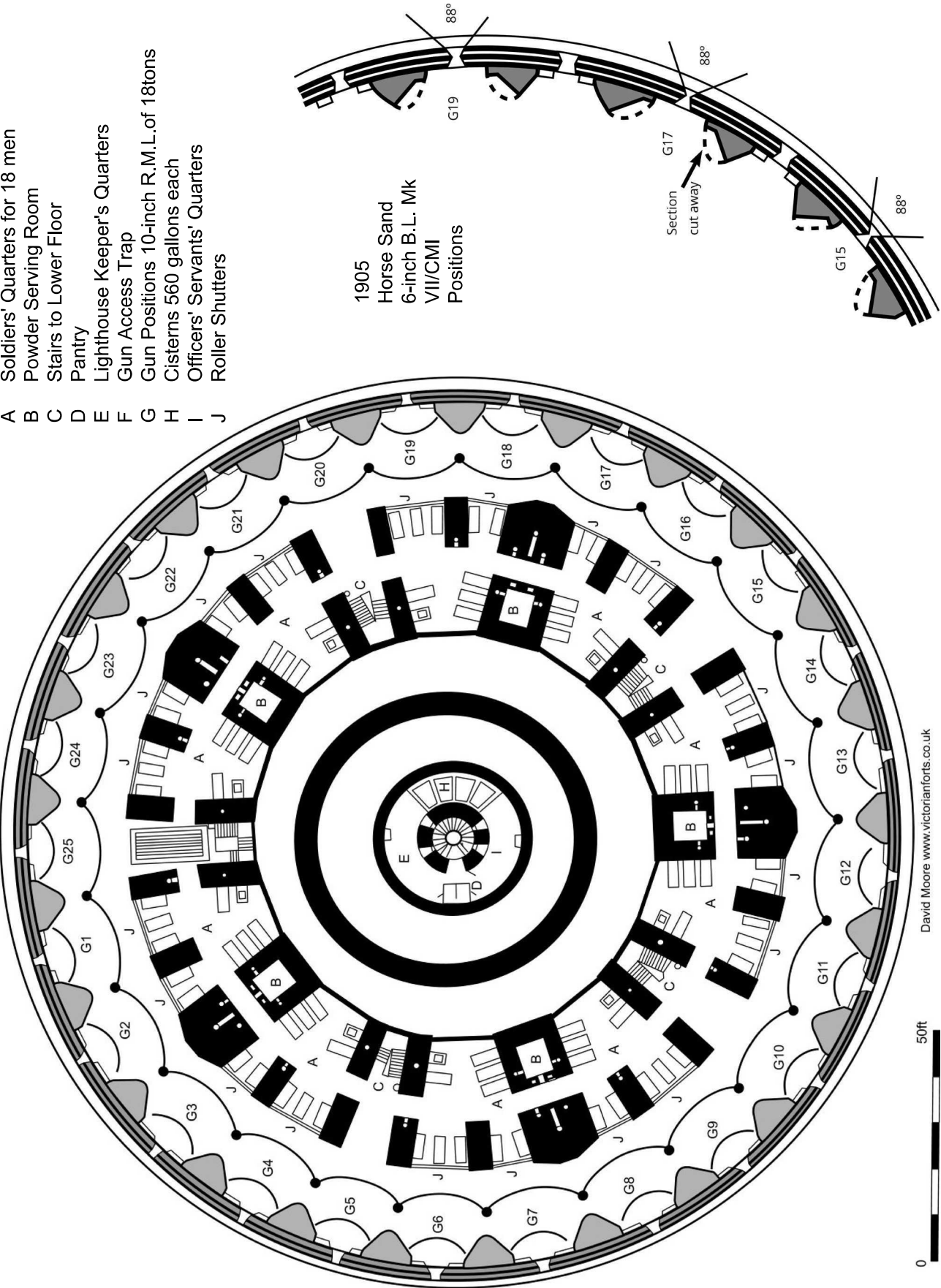


*Napoleon III did reach Hampshire. After the disastrous Franco-Prussian War of 1870-71, he came to England, where he died in 1874 at Chislehurst in Kent. The Empress Eugenie caused a vast mausoleum to be constructed at Farnborough Hill and his body taken there. His son, the Prince Imperial was killed during the Zulu War in 1879 and the Empress, who died in 1920, were also buried there.



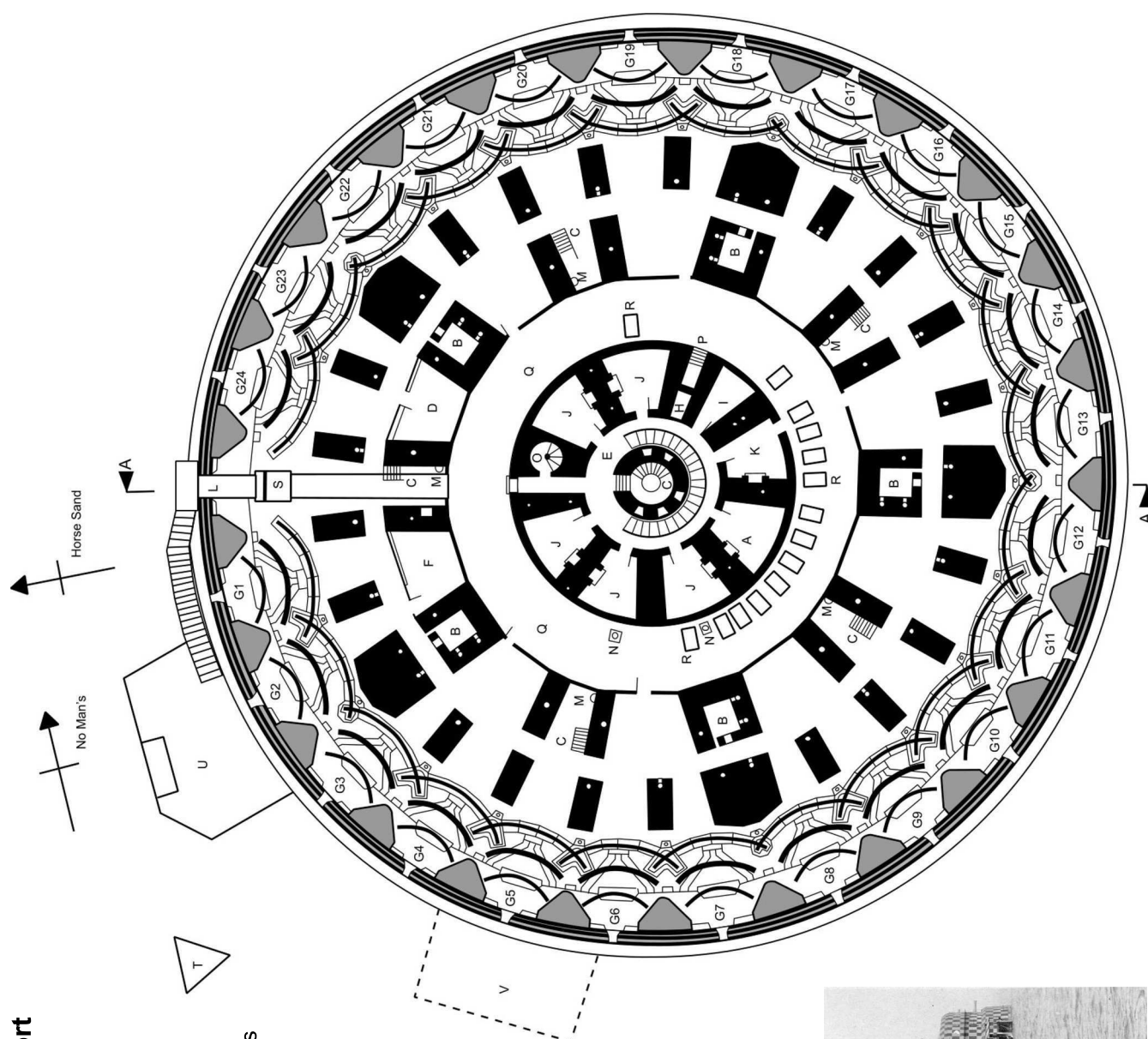
Horse Sand and No Man's Land Fort
Upper Gun Floor Plan 1880

- A Soldiers' Quarters for 18 men
- B Powder Serving Room
- C Stairs to Lower Floor
- D Pantry
- E Lighthouse Keeper's Quarters
- F Gun Access Trap
- G Gun Positions 10-inch R.M.L. of 18tons
- H Cisterns 560 gallons each
- I Officers' Servants' Quarters
- J Roller Shutters

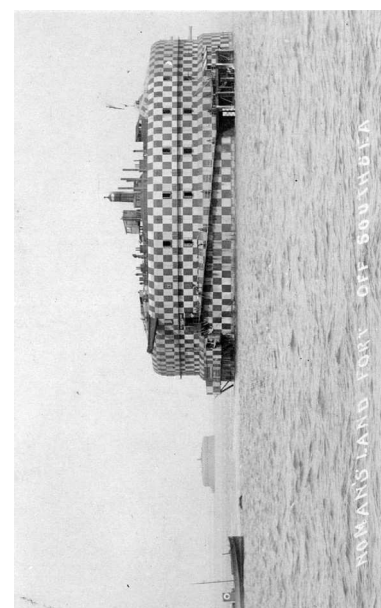


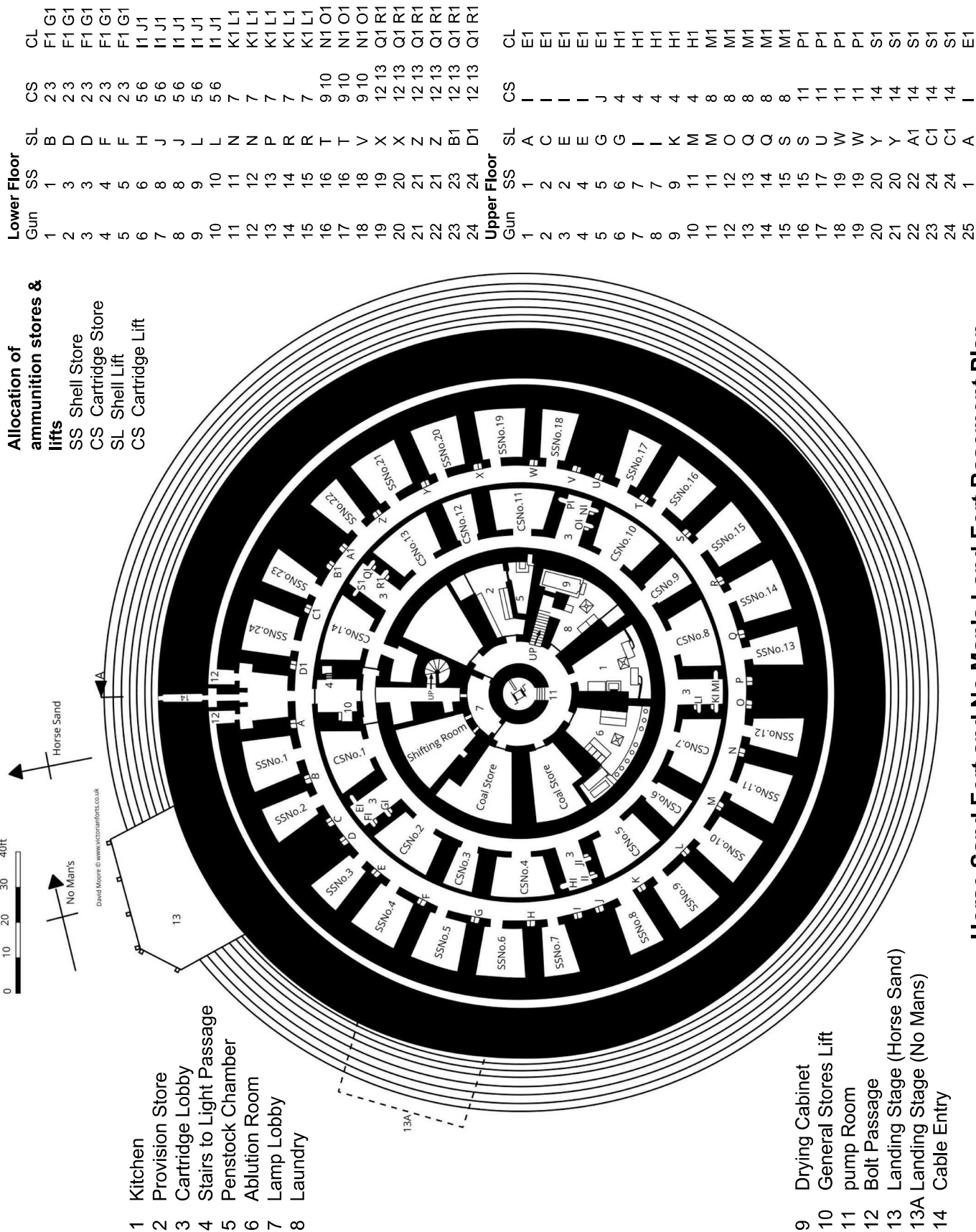
Horse Sand and No Man's Land Fort Lower Gun Floor Plan 1880

- A Officers' Mess
- B Powder Serving Room
- C Stairs to Upper Floor
- D NCO's Quarters
- E Central Passage
- F Latrine
- G Gun Positions 12.5-inch R.M.L. of 38 tons
- H Officers' Latrine
- I Officers' Servant's Qtrs
- J Officers' Quarters
- K Officers' kitchen
- L Entrance
- M Stand Pipe
- N Coal Shaft
- O Stairs to Magazine
- P Stairs to Basement
- Q Outer Passage
- R Skylights
- S Armoured Door
- T Dolphin
- U Landing Stage (Horse Sand)
- V Landing Stage (No Mans L)



Below: No Man's Land Fort in 1909





Horse Sand Fort and No Man's Land Fort Basement Plan

No Man's Land Fort Basement Magazines in 1893

- A Submarine Mines Test Room
- B Battery Room for Submarine Mines
- C Entrance to Shell Passage
- D Ladder to Lamp Passage
- E Entrance to Cartridge Passage
- F Shifting Room
- G R.E. Store
- H Coal Store
- I Bath Room
- J Ablution Room
- K Cook House
- L Laundry
- M Drying Closet
- N Penstock Chamber
- O Provision Store
- P Artillery General Store
- Q Hot Water Apparatus
- R Artillery Store for Small Stores

Shell Lifts

- a 12.5inch S.L. No.2 Lower Floor
- b 10inch S.L. No.2 & 3 Upper Floor
- c 12.5inch S.L. No.2 & 3 Lower Floor
- d 10inch S.L. No.4 Upper Floor
- e 12.5inch S.L. No.4 & 5 Lower Floor
- f 10inch S.L. 5 & 6 Upper Floor
- g 12.5inch S.L. No.6 Lower Floor
- h 10inch S.L. No.7 & 8 Upper Floor
- i 12.5inch S.L. No. 7 & 8 Lower Floor
- j 10inch S.L. No.9 Upper Floor
- k 12.5inch S.L. No.9 & 10 Lower Floor
- l 10inch S.L. No. 10 & 11 Upper Floor
- m 12.5inch No.11 & 12 Lower Floor
- n 10inch S.L. No.13 Lower Floor
- o 12.5inch S.L. No.13 Lower Floor
- p 10inch S.L. No.13 & 14 Upper Floor
- q 12.5inch S.L. No.14 & 15 Lower Floor
- r 10inch S.L. No.15 & 16 Upper Floor
- s 12.5inch S.L. No.16 & 17 Lower Floor
- t 10inch S.L. No.17 Upper Floor
- u 12.5inch S.L. No.18 Lower Floor
- v 10inch S.L. No.18 & 19 Upper Floor
- w 12.5inch S.L. No.19 & 20 Lower Floor
- x 10inch S.L. No.20 & 21 Upper Floor
- y 12.5inch S.L. No.21 & 22 Lower Floor
- z 10inch S.L. No.22 Upper Floor
- aa 12.5inch S.L. No.22 Lower Floor
- ab 10inch S.L. No.23 Upper Floor
- ac 12.5inch S.L. No.24 Lower Floor
- ad 10inch S.L. No.1 & 25 Upper Floor

S.S.

Shell Stores

1. 12.5inch & 10inch guns
2. 10inch guns
3. 12.5inch guns
4. 12.5inch & 10inch guns
5. 12.5inch & 10inch guns
6. 12.5inch & 10inch guns
7. 10inch guns
8. 10inch guns
9. 12.5inch & 10inch guns
10. 12.5inch
11. 12.5inch & 10inch guns
12. 12.5inch & 10inch guns
13. 12.5inch & 10inch guns
14. 12.5inch & 10inch guns
15. 12.5inch & 10inch guns
16. 12.5inch
17. 10inch guns
18. 12.5inch
19. 12.5inch & 10inch guns
20. 12.5inch & 10inch guns
21. 12.5inch
22. 10inch guns
23. 12.5inch

C.S.

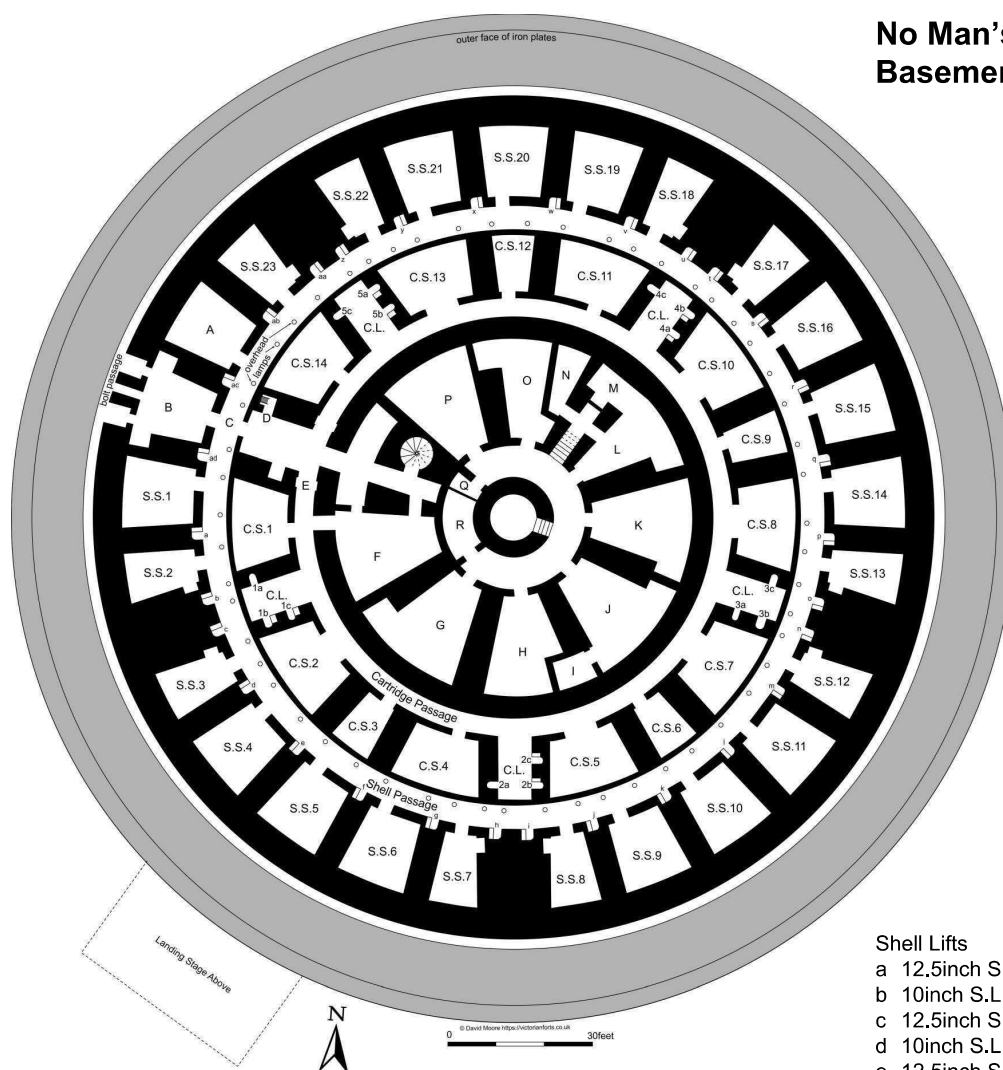
Cartridge Stores

1. 10inch guns
2. 12.5inch guns
3. 12.5inch guns
4. 10inch guns
5. 12.5inch guns
6. 12.5inch guns
7. 12.5inch guns
8. 10inch guns
9. 12.5inch guns
10. 12.5inch guns
11. 10inch guns
12. 12.5inch guns
13. 12.5inch guns
14. 10inch guns

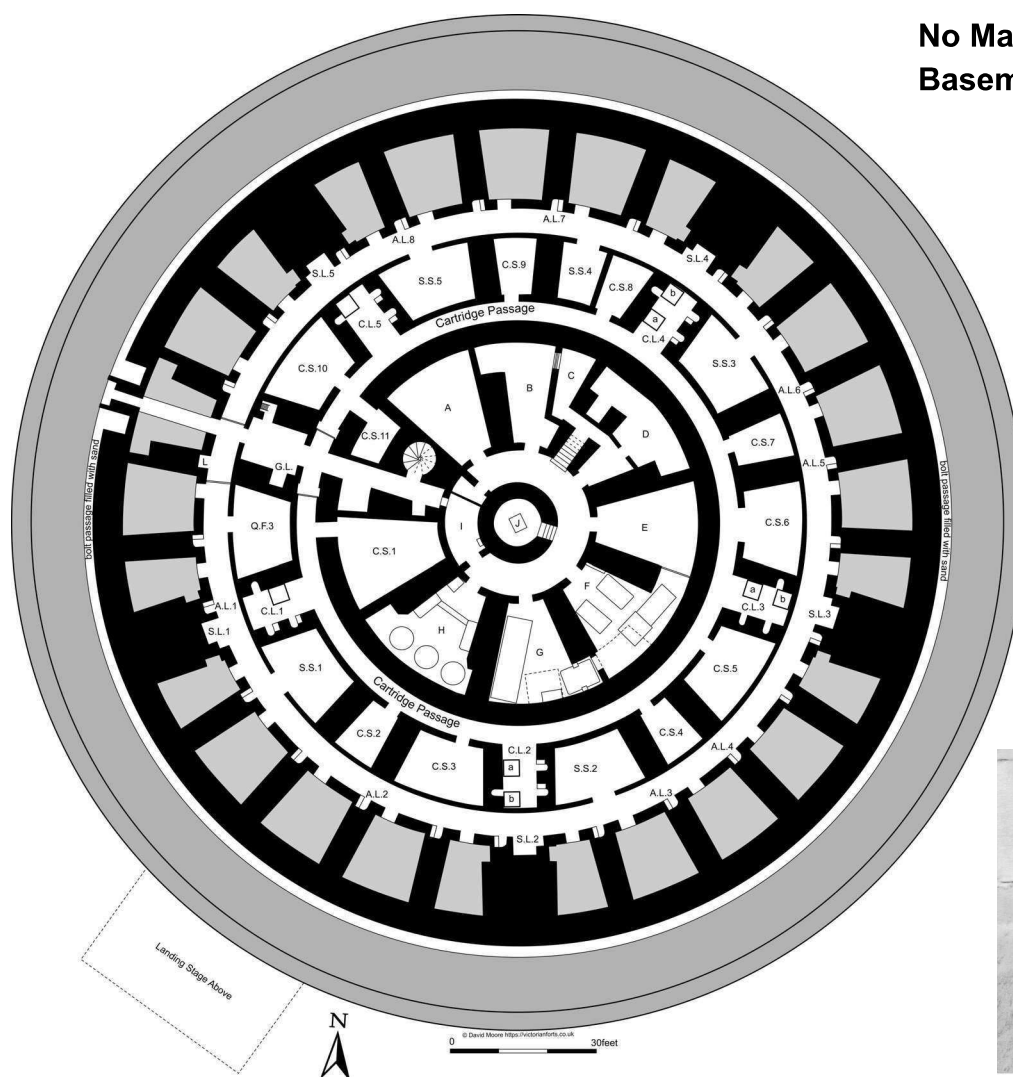
C.L.

Cartridge Lifts

- 1a No.1 to 5 & 25 Upper Floor
- 1b No.1 to 5 Lower Floor
- 1c No.1 to 5 Lower Floor
- 2a No.6 to 10 Upper Floor
- 2b No.6 to 10 Lower Floor
- 2c No.6 to 10 Lower Floor
- 3a No. 11 to 14 Lower Floor
- 3b No.11 to 14 Lower Floor
- 3c No. 11 to 14 Upper Floor
- 4a No.15 to 19 Lower Floor
- 4b No.15 to 19 Lower Floor
- 4c No.15 to 19 Upper Floor
- 5a No.20 to 24 Lower Floor
- 5b No.20 to 24 Lower Floor
- 5c No.20 to 24 Upper Floor

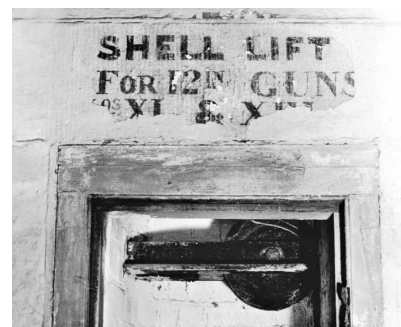


No Man's Land Fort Basement Magazines in 1895



- L Ladder to Lower Gun Floor
- A Submarine Mining Test Room
- B Provision Store
- C Penstock Room and Lamp Room
- D Coal Store
- E Cook House
- F Electric Light Engine Room
- G Engine Room for Hydraulic Machinery 12inch B.L.s
- H Hydraulic Machinery Boiler Room
- I Engine Room
- J Pump (well head)

The outer ring of shell stores have been filled with concrete



Cartridge Stores

- C.S.1 For all 10-inch R.M.L. 18 ton guns: 600 cylinders
- C.S.2 For 12-inch B.L. 47ton guns: 200 cylinders
- C.S.3 For 12-inch B.L. 47ton guns: 600 cylinders
- C.S.4 For 12-inch B.L. 47ton guns: 290 cylinders
- C.S.5 For 12-inch B.L. 47ton guns: 600 cylinders
- C.S.6 For 12-inch B.L. 47ton guns: 600 cylinders
- C.S.7 For 12.5inch R.M.L. 38 ton guns: 290 cylinders
- C.S.8 For 12.5inch R.M.L. 38 ton guns: 310 cylinders
- C.S.9 For 12.5inch R.M.L. 38 ton guns: 290 cylinders
- C.S.10 For 12.5inch R.M.L. 38 ton guns: 600 cylinders
- C.S.11 For 12.5inch R.M.L. 38 ton guns: 210 cylinders

Q.F.3 Quick Fire Ammunition Store

Cartridge Lifts

- C.L.1 For all 10-inch R.M.L. 18 ton Guns
- C.L.2a For 12-inch B.L. No 10 & 12 Upper Tier
- C.L.2b For 12-inch B.L. No 9 & 11 Lower Tier
- C.L.3a For 12-inch B.L. No 14 & 16 Upper Tier
- C.L.3b For 12-inch B.L. No 13 & 15 Lower Tier
- C.L.4a For Quick Fire Ammunition Upper Tier
- C.L.4b For 12.5-inch R.M.L. 17,18,19 & 20 Lower Tier
- C.L.5 For 12.5-inch R.M.L. 21,22,23 & 24 Lower Tier

Shell Stores

- S.S.1 For all 10-inch R.M.L. 18 ton guns
- S.S.2 For 12-inch B.L. 47 ton guns
- S.S.3 For 12-inch B.L. 47 ton guns
- S.S.4 For 12.5-inch R.M.L. 38 ton guns
- S.S.5 For 12.5-inch R.M.L. 38 ton guns

Shell Lifts

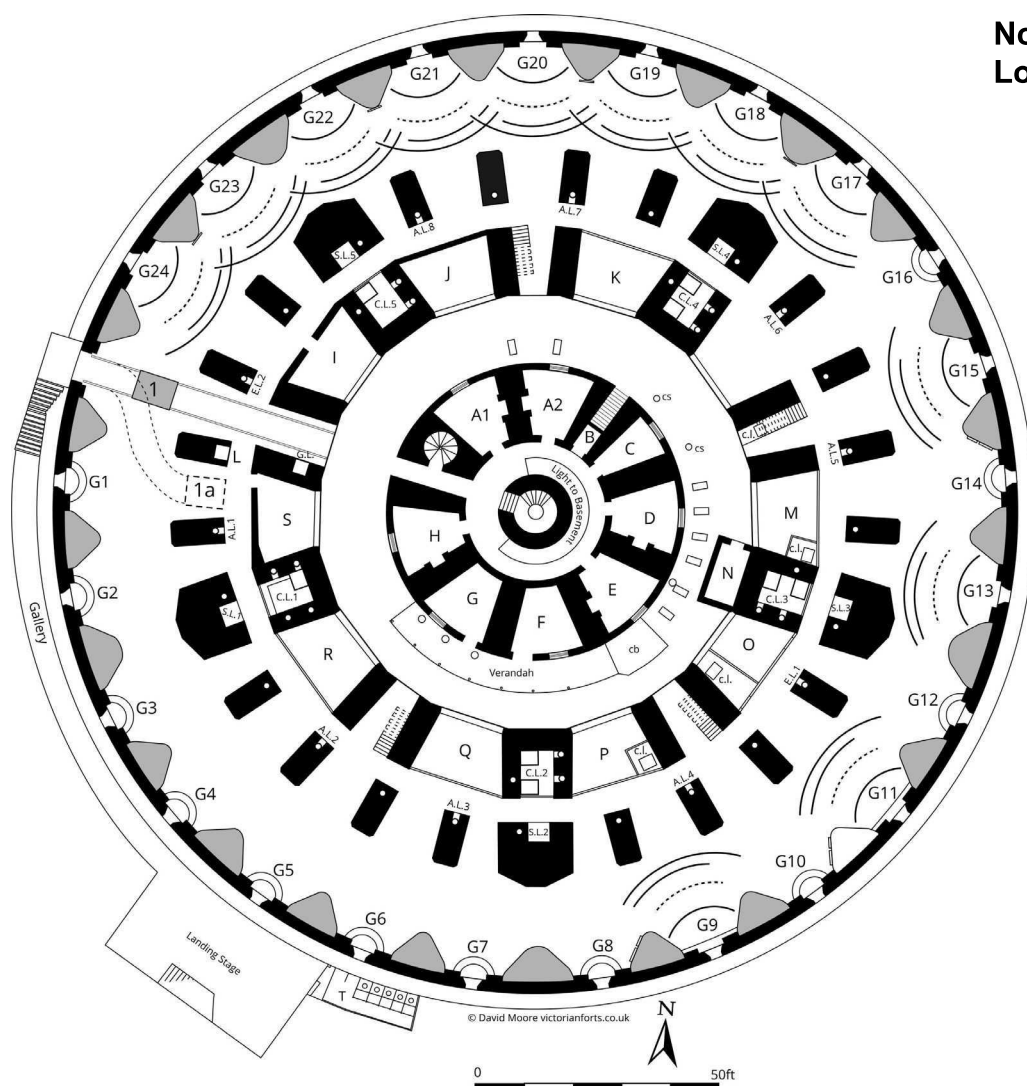
- G.L. General Lift
- S.L.1 Hydraulic Lift for all 10-inch R.M.L. guns
- S.L.2 For 10-inch R.M.L. Nos 6,7,8 & 12-inch B.L. 47 Ton guns No 9 & 11 Lower Tier & No 12 & 14 Upper Tier
- S.L.3 For 12-inch B.L. 47 Ton guns No 3 & 15 Lower Tier & No 12 & 14 Upper Tier
- S.L.4 For 12-inch B.L. 47 Ton guns No 16 Upper Tier & 12.5-inch R.M.L. No 17, 18,19 & 20 Lower Tier
- S.L.5 12.5-inch R.M.L. No 21, 22, 23 & 24 Lower Tier

Auxiliary Lifts

- A.L.1 All 10-inch R.M.L. guns
- A.L.8 12.5-inch R.M.L. guns

Shells were moved from the shell rooms to the shell lifts using overhead rails.

No Man's Land Fort Lower Gun Floor in 1895



- A.1 Officer's Quarters No.1
- A.2 Officer's quarters No.2
- B W.C.
- C Pantry
- D Mess kitchen
- E Mess Room
- F R.E.Store
- G R.A.Store
- No.3 Spare Store
- H R.E.Office
- I Staff Sergeant's Quarters & Telephone Office
- J Canteen
- K Artillery Store
- No.2 Group Store
- L Ladder to Shell Passage
- M R.A. Workshop
- N Q.F. Ammunition Store No.2
- O Artillery Store No.2
- P R.E.Workshop
- Q Bedding Store
- R Artillery Store No.1
- S Latrines
- T Urinal and Latrines
- cs Coal Shoot
- cb Cover to Coal Bunker
- 1 Movable Shield on rails
- 1a Proposed position for Shield

Armament

G1 to G8, G10, G12, G14, G16 Q.F. 6pdr 8cwt
 G9, G11, G13, G15 12-inch B.L. 47 tons
 G16 to G24 12.5-inch R.M.L. 38 tons

Cartridge Lifts

C.L.1 For all 10-inch R.M.L. 18 ton Guns
 C.L.2 For 12-inch B.L. No 9 & 11
 C.L.3 For 12-inch B.L. No 13 & 15
 C.L.4 For 12.5-inch R.M.L. 17, 18, 19 & 20
 C.L.5 For 12.5-inch R.M.L. 21, 22, 23 & 24

Shell Lifts

G.L. General Lift
 S.L.1 Hydraulic Lift for Q.F.Guns
 S.L.2 For 12-inch B.L. 47 Ton guns
 S.L.3 For 12-inch B.L. 47 Ton guns
 S.L.4 12.5-inch R.M.L. No 17, 18, 19 & 20 Lower Tier
 S.L.5 12.5-inch R.M.L. No 21, 22, 23 & 24 Lower Tier

A.L. Auxiliary Lifts

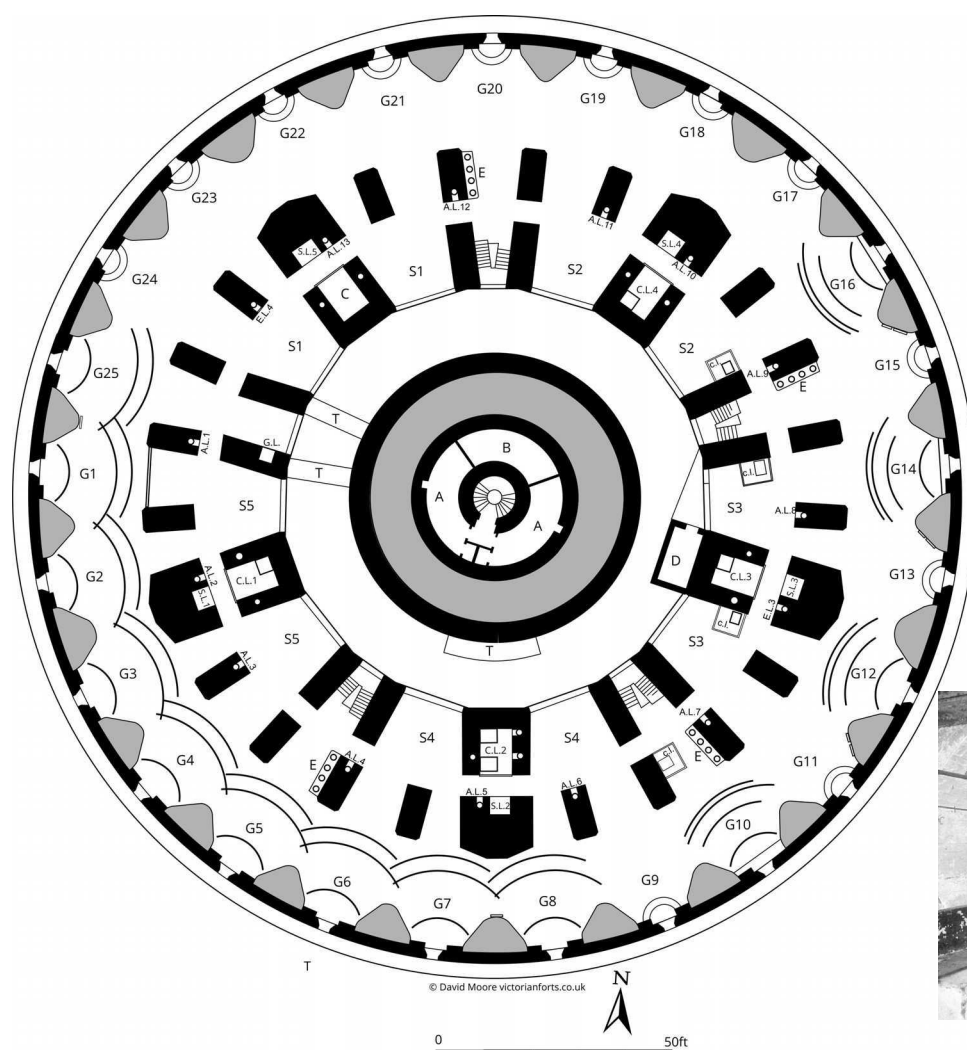
A.L.4 For 12-inch B.L. guns

A.L.5 For 12-inch B.L. guns
 A.L.7 For 12.5-inch R.M.L. guns
 A.L.8 For 12.5-inch R.M.L. guns

E.L.1 Electric Light Switches for circuits A & B
 E.L.2 Electric Light Switches for circuits C & D
 c.l. Control Levers for 12-inch B.L. gun



Horse Sand Fort: Movable Shield on rails

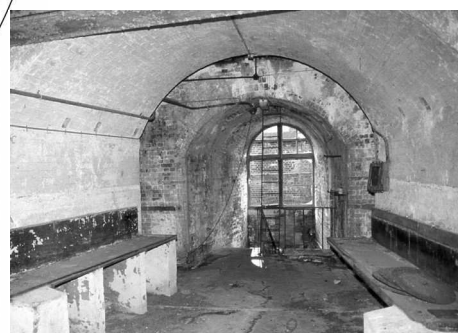


No Man's Land Fort Upper Gun Floor in 1895

- A. Lighthouse Keeper's Quarters
- B. Cisterns
- C. Oil Store
- D. Q.F. Ammunition Store No.1
- E. Ablution Basins
- T. Tank
- c.l. Control Levers for 12-inch B.L. gun
- A1 to S5 Soldiers' Quarters 18 men

1891 Accommodation

- Horse Sand Fort
- 5 officers 90 men
- In addition hammock hooks to accommodate 207 men are fixed in the gallery and barrack rooms
- No Man's Land Fort
- 3 officers 90 men
- In addition hammock hooks to accommodate 199 men are fixed in the gallery and barrack rooms



Ablutions

Armament

- G1 to G8 10-inch R.M.L. 18 tons
- G9, G11, G13, G15, G17 to G25 6inch Q.F. 8cwt
- G10, G12, G14, G16 12-inch B.L. 47 Tons

Cartridge Lifts

- C.L.1 For all 10-inch R.M.L. 18 ton guns
- C.L.2 For 12-inch B.L. 47 ton guns
- C.L.3 For 12-inch B.L. 47 ton guns
- C.L.4

Shell Lifts

- G.L. General Lift
- S.L.1 For 10-inch R.M.L. 18 ton guns
- S.L.2 For 10-inch R.M.L. 18 ton guns
- S.L.3 For 12-inch B.L. 47 Ton guns
- S.L.4 For Q.F. guns
- S.L.5 12.5-inch R.M.L. No 21, 22, 23 & 24 Lower Tier

Auxiliary Lifts

- A.L.2 For 10-inch R.M.L. guns

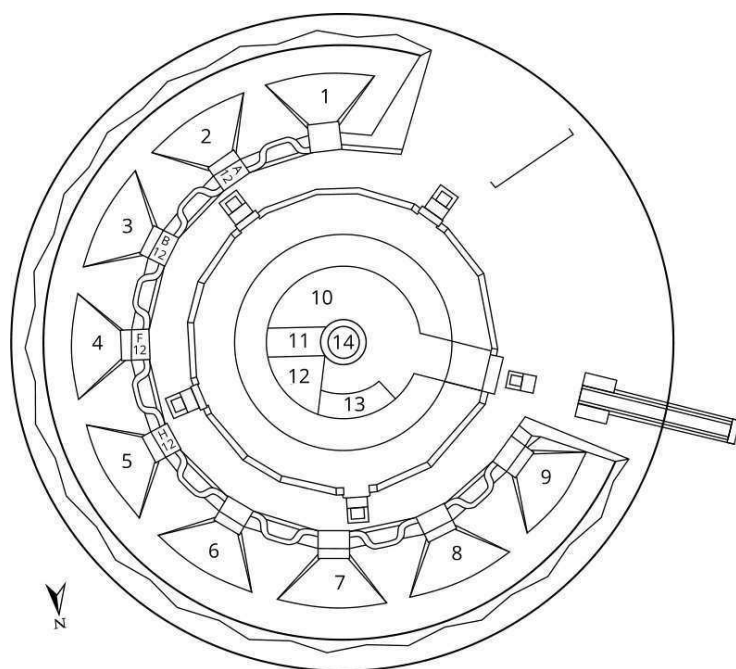
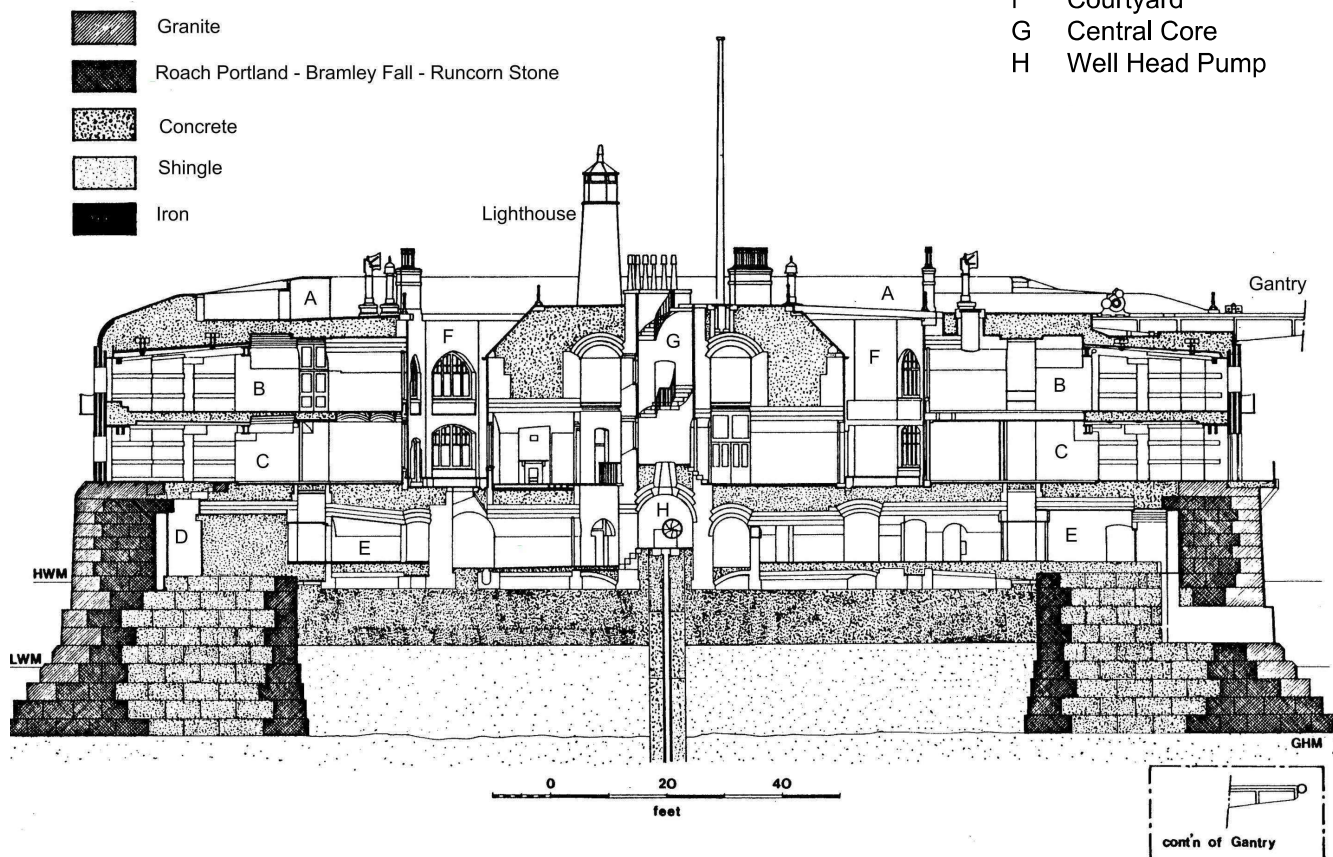
- A.L.7 For 12-inch B.L. guns
- A.L.9 For 12-inch B.L. guns
- A.L.8 For 12.5-inch R.M.L. guns

- E.L.3 Electric Light Switches for circuits E & F
- E.L.4 Electric Light Switches for circuits G & H



Horse Sand Fort: Yoke mounting for 12-inch B.L.

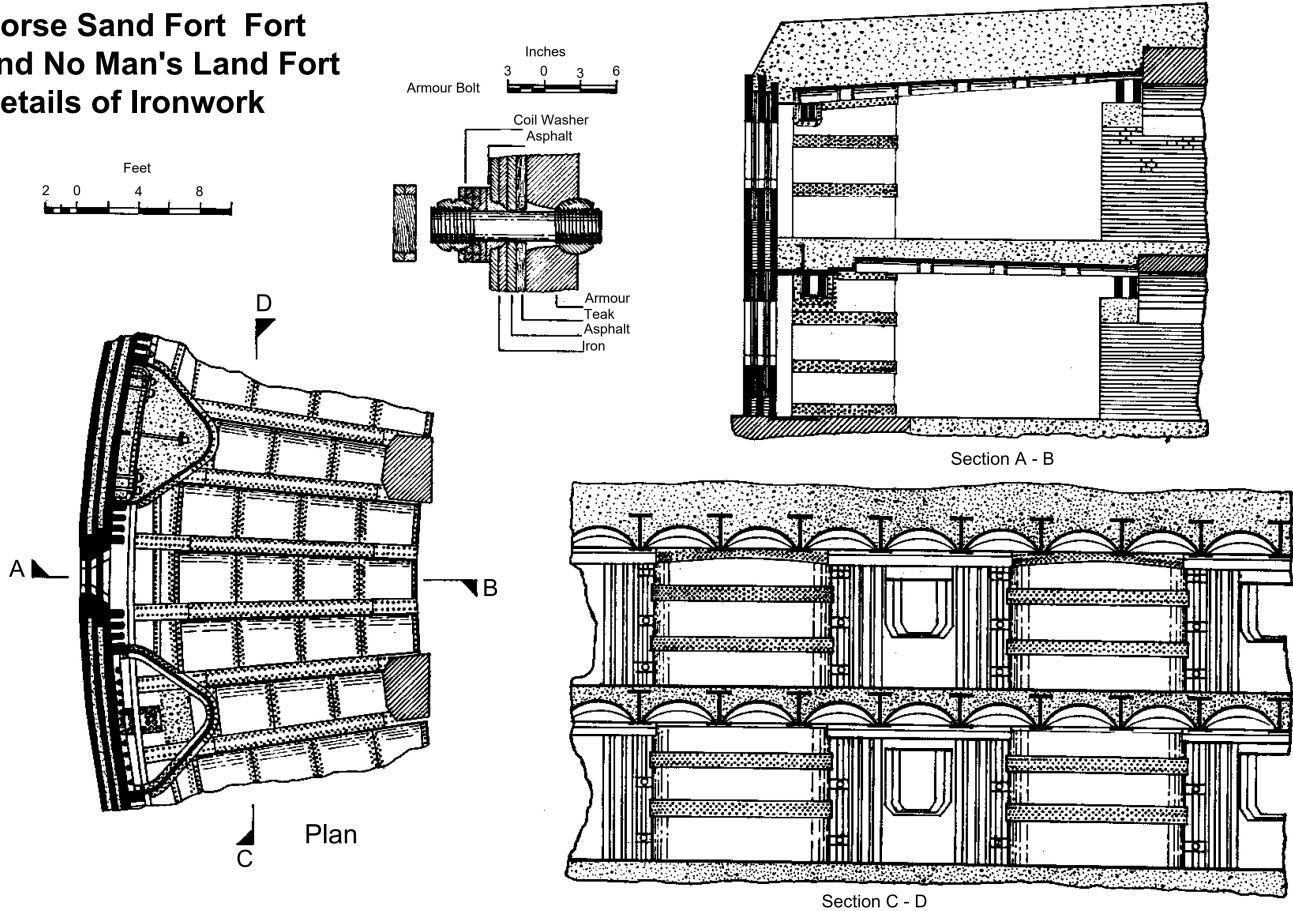
Horse Sand Fort Fort and No Man's Land Fort Section A - A



Roof of No Man's Land Fort 1902

- 1 Signalling Store
- 2 No.2 Position Finding Cell
- 3 No.3 Position Finding Cell
- 4 No.4 Position Finding Cell
- 5 No.5 Position Finding Cell
- 6 4.7-inch Q.F. Store
- 7 4.7-inch Q.F. Store
- 8 Store for P.F. Equipment
- 9 Spare Store
- 10 Telephone Room
- 11 Fire Command Station
- 12 Light House
- 13 Position Finder Store
- 14 Stairs

Horse Sand Fort Fort
and No Man's Land Fort
Details of Ironwork



The two forts are almost identical in dimensions and construction. They are circular, to a radius of 100ft and the gun ports are either 24ft or 26ft apart. Treating each as composed of an inner structure, and an armoured wall, the former, or skeleton, as it might be called, consists of the following parts:

First there is a circular baseplate 2in thick, and about 3ft wide, sunk by masonry, and going completely round the fort. In this base are slotted large holes to take the feet of upright armour bars which back up the armour plates in front of the guns. Next come the lower pier casings, 11ft 9in and 12ft 9in by 7ft 6in made of $\frac{3}{4}$ in plate, very strongly put together, and filled with concrete. Into the upper parts of these piers are set the ends of solid bars, which have to carry a part of the load of the floor above.

Next above these lower piers is a ring of 3in plate going all round the fort. It is slotted with holes, and the upright bar supports, already mentioned, are threaded through them. On this 3in plate the front end of the radial girders of the upper floor gun floor rest. Their rear ends are carried by box girders bearing on the masonry piers of the fort. Between the radial girders are the arch-plates, which complete the floor. The front ends of these four girders are secured to a continuous curved plate standing on edge. No part of this floor structure is fastened to the 3in plate. It merely rests on it, and the surfaces are free to slide if necessary. The object of this provision is that if the front armoured wall should be heavily battered, the risk of the racers of the upper guns being thrown out of position thereby should be reduced to a minimum.

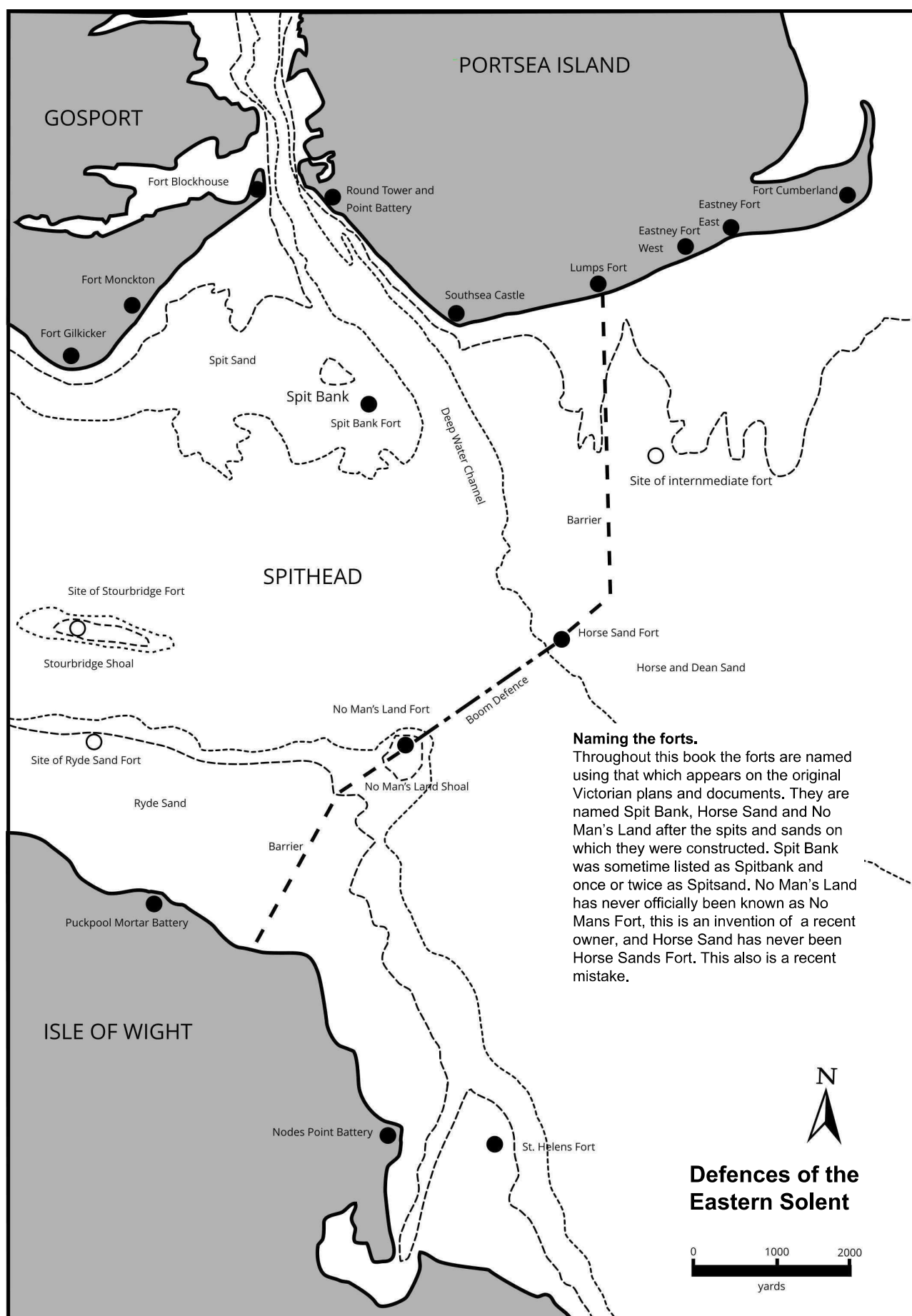
The construction of the piers and framework of the upper tier is, generally speaking, a repetition of that of the lower casemates, except in small details. The armour bar supports are one in length from the lower floor to the roof, where they pass through another continuous ring $1\frac{1}{2}$ in thick. The pier casings are filled from top to bottom with Portland cement concrete. The safe load of the upper gun floor, and of the roof, is equal to a mass of concrete 10ft thick laid over it, which is equal to half a ton on every square foot.

Next, the armoured wall is in three thicknesses. The inner ring is all 5in thick, and there is 1in of wood and Portland cement between it and the skeleton structure and to the piers. The frames round the ports are $2\frac{1}{4}$ in thick, and are exactly like those at the Portland Fort. The plates of the next or middle thickness all stand on their ends, and are 22ft 6in long, reaching from the granite base to the level of the roof.

The plates in which the ports are formed are 7in thick (each weighs 18tons), the rest are 5in thick, and are in two tiers of about 11ft each. They are bolted to the middle plates. The intervals between the armour plates are filled with concrete, except at the port frames, where there is wood. At the level of the top of the lower front plates there is a gallery all round the outside of the fort.

The weight of ironwork in each of the forts is as follows:

	tons	tons	total
Skeleton	per gun	50	2,450
Armoured wall	per gun	75	3,764
			6,214



St Helen's Fort by Anthony Cantwell, with Peter Sprack

Construction

In the days of sailing ships, St Helen's Road provided a good anchorage for the British fleet. It was protected from all but south-east winds, and anchors held well in the sea bed of mud and blue clay. There was up to 8 fathoms (48 feet or 1.83m) below the keel and access to a good spring of water in St Helen's village. The 1859 Royal Commission did not originally include the defence of the anchorage in its plans. The 10-gun batteries planned for Appley House and Nettlestone Point were intended to support the projected sea forts on the Sturbridge and No Man's land shoals, respectively. A battery at St Helen's Point would be only for beach defence.

As stated, difficulties with bottomless ground led to the abandonment of the Sturbridge Sand fort and an 1866 scheme to place one on Ryde Sand instead led to plans for a sea fort at St Helen's. This was not the first suggested work there: in April 1863 the Defence Committee considered a proposal for an earthwork battery at St Helen's. As no suitable site could be found a design was approved for a masonry casemated work for nine guns on the beach in front of St Helen's Point, presumably both to command the adjacent beaches and the anchorage. Nothing came of this and in February 1867 the committee approved a design for a small sea

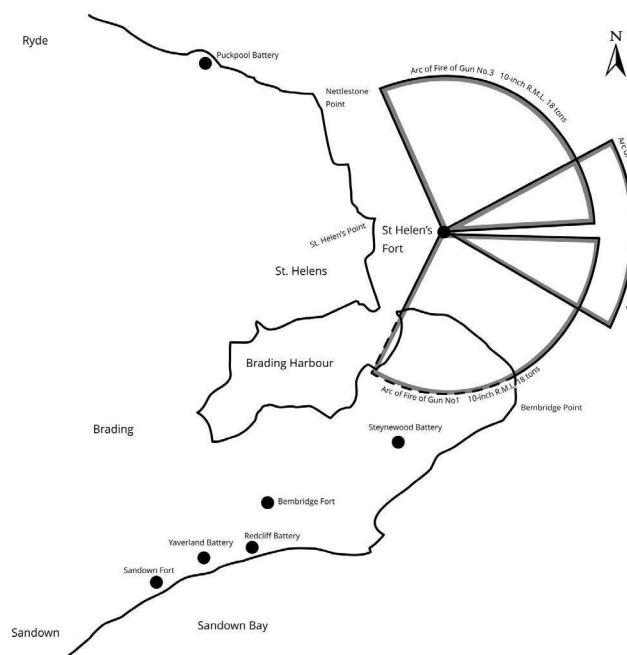


St. Helen's Fort: The central shielded gun port for a 12.5inch R.M.L.

fort of one tier of casemates, with iron plating on the seaward side and granite where the fort faced the shore. As with Spit Bank Fort this was because the sandbanks behind the fort would prevent any heavy ship attacking from that direction. The fort would cover St Helen's Road and the adjacent shore from Bembridge to Nettlestone, as well as forming a connecting link between the Spithead defences and Bembridge Fort.

The first suggested armament was of fifteen guns in casemates, but in 1867 the Defence Committee approved the addition of two turrets on the superstructure, each mounting two guns. In late 1868 this committee considered whether a superstructure of three two-gun turrets should replace the casemated design altogether but rejected the idea. The fort was placed on a spit projecting eastward from a sandbank off Bembridge Point. Even today this spit is uncovered at low water ordinary neap tides. The sand overlay shingle: as the fort was in an exposed position a ring of iron caissons, filled with concrete and brickwork in cement, was sunk 25 feet (7.6m) into the shoal to the soft blue clay below. The structure was 150 feet (45.7m) in diameter. A breakwater was created a further 150 feet eastward of the fort by dumping 9,000 tons of Portland rubble around the caissons out to 20 feet (6.1m). The sand within the ring of caissons was dredged out and filled with concrete 10 feet thick. The foundations were nearly completed by 1867, whereupon walls of Roche, Portland and Bramley Fall Stone were erected.

The main bulk of the fort and its superstructure were subsequently completed in concrete, but not without problems. Despite a statement in an 1869 report that the fort was 'well designed as to permanency and stability',





St. Helen's Fort: One of the two projecting armoured casemates for a 10inch R.M.L. on a turntable

the foundations began to settle unevenly so that the work began to tilt. It was decided to keep the first floor superstructure on the centre of the foundations, so that St Helen's Fort was unlike the other Spithead sea forts above the basement level.

With the abandonment of the full first storey to save weight, the projected armament of four 12-inch R.M.L. in two turrets, six 10-inch R.M.L. in the seaward casemates and four 7-inch R.M.L. facing the land had to be substantially reduced. One proposal was made in May 1870 by the Defence Committee. This was for a two-gun turret on the centre line with one gun on each side of it on a Moncrieff mounting, instead of the same number of guns in iron-plated casemates.

The idea of a 'disappearing carriage' was developed in 1865 by Captain Moncrieff, an artillery militia officer. The gun was concealed in a pit and the barrel only appeared for firing. Recoil forced the counter-weighted assembly which supported the gun down into the pit where it was reloaded in perfect safety. When released, the counterweight brought the gun up for firing. It was soon found, however, that the blast of the turret guns as they fired over the Moncrieffs would probably wreck the pits and injure the men therein. In 1873 the committee therefore recommended mounting the lower seaward gun on each flank (a 10-inch R.M.L.) on a turntable. These mountings were installed, but further settlement of the fort in 1878 led to the abandonment of the turret. All the emplacements had to be shifted to the rear of the fort and there was no room for the turret. Instead a 12.5-inch R.M.L. was installed in the centre face, firing through an iron-shielded embrasure. This heavy

armament was installed in 1880. It had been intended to mount a 40pounder RBL on either side of the entrance at the rear but this never happened: these rear casemates were only used for accommodation.

Description

A two-level landing stage, constructed in 1880 and demolished in 1959, extended north from the rear of the fort. This led to the entrance at so-called basement level: space around the pump room at the centre of this floor were the magazines and stores. Each set of shell and cartridge stores was situated underneath the relevant gun above, the ammunition being taken up by lift. Because of the weight of the turntable for the 10-inch guns, the floor below each was strengthened with cast-iron columns. Fresh water was raised by a pump from 500 feet (152m) below the sea bed at the rate of 120 gallons an hour. Two tanks above the entrance passage could hold about 2,000 gallons.

Accommodation was provided in two rooms at the rear of the gun floor for an N.C.O. and five gunners, although hammock hooks could cater for another 24 men in wartime. In the central casemate was a 12.5-inch MkII chambered R.M.L. on a steel traversing platform.

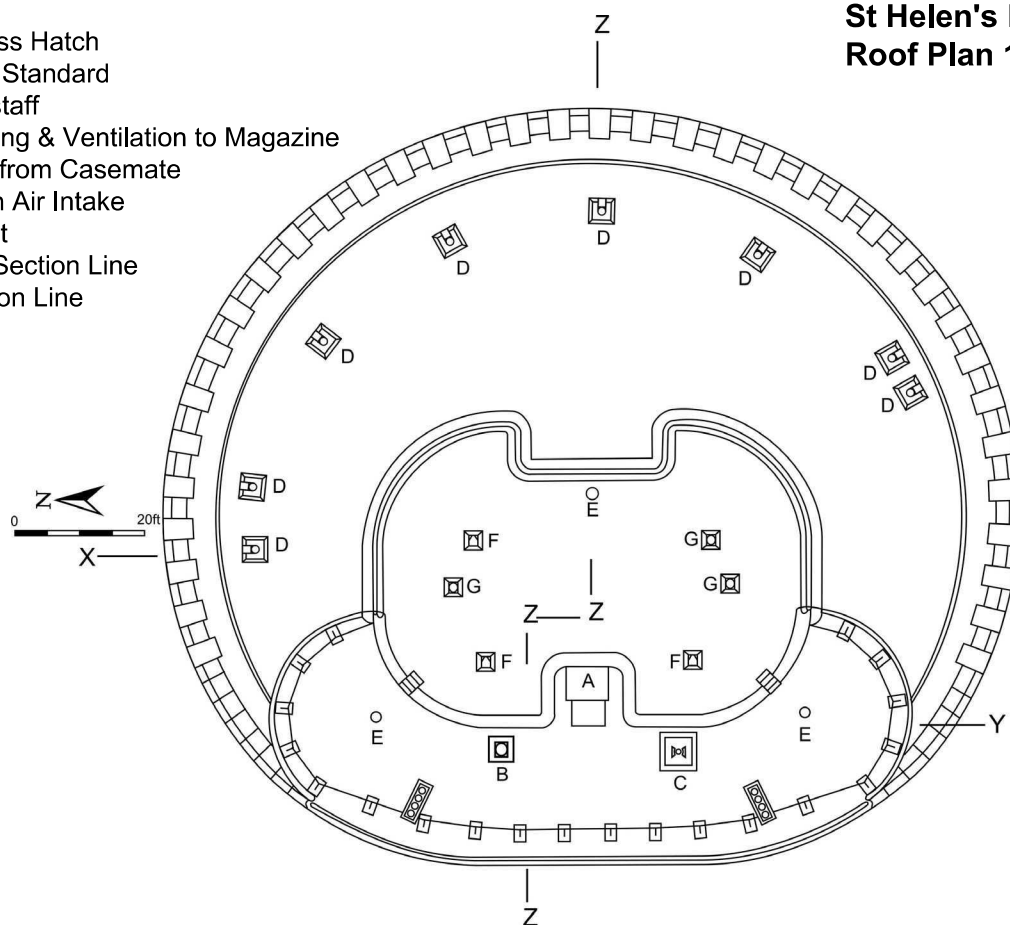
The two 10-inch R.M.L.'s were mounted on steel plate turntables 23 feet in diameter in order to fire out of both embrasures in each casemate. The turntables revolved around central spindles centred on granite blocks and were turned by winches worked from adjacent chambers. Thus one gun could cover an arc of 120 degrees. All three casemates were armoured with three layers of 5-inch wrought-iron plates separated by iron concrete. Between the embrasures were pier casings of concrete-filled iron to support the roof.

History, 1880 - 1957

Between 1895 and 1899 two six-pounder Hotchkiss Q.F. guns on cone mountings were placed on the roof at the rear of the fort to cover the anchorage against torpedo boats. By 1904, however, Nodes Point Battery had been built above the shore north-west of the fort to mount modern 6-inch and 9.2-inch B.I. guns. These made the old R.M.L.'s on St Helen's fort obsolete and it went out of use. The soldiers' quarters were altered for a caretaker who watched over the Trinity House navigation light on top of the square lattice tower 30 feet high which was erected on top of the fort in 1911.

- A Access Hatch
- B Light Standard
- C Flagstaff
- D Lighting & Ventilation to Magazine
- E Vent from Casemate
- F Fresh Air Intake
- G Outlet
- XY Half Section Line
- ZZ Section Line

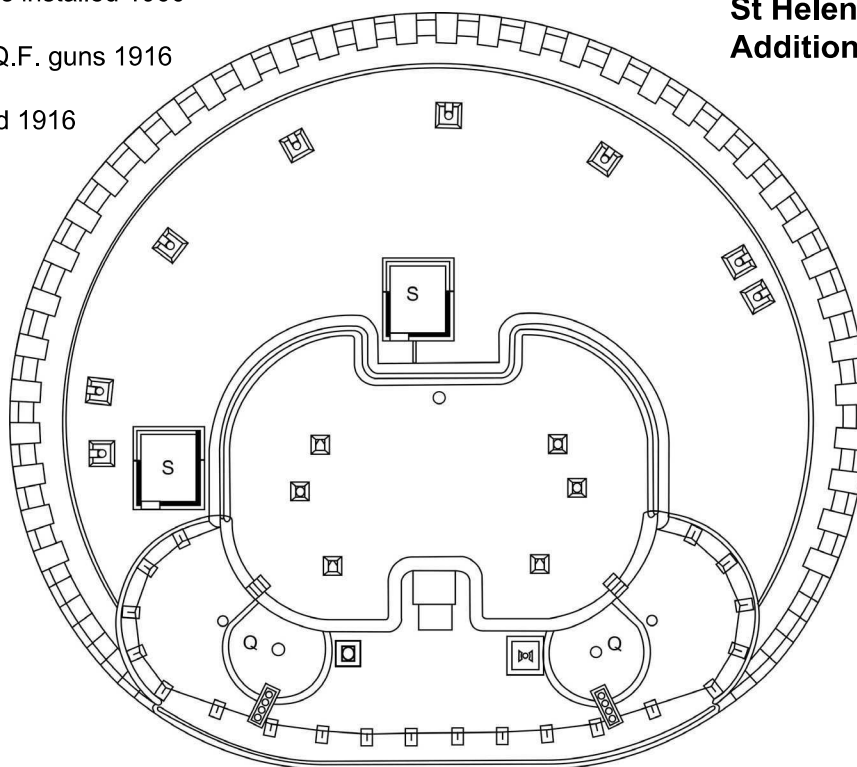
**St Helen's Fort
Roof Plan 1879**



- Q 6 pdr Nordenfelt guns installed 1900
removed after 1904
Replaced by 12pdr Q.F. guns 1916

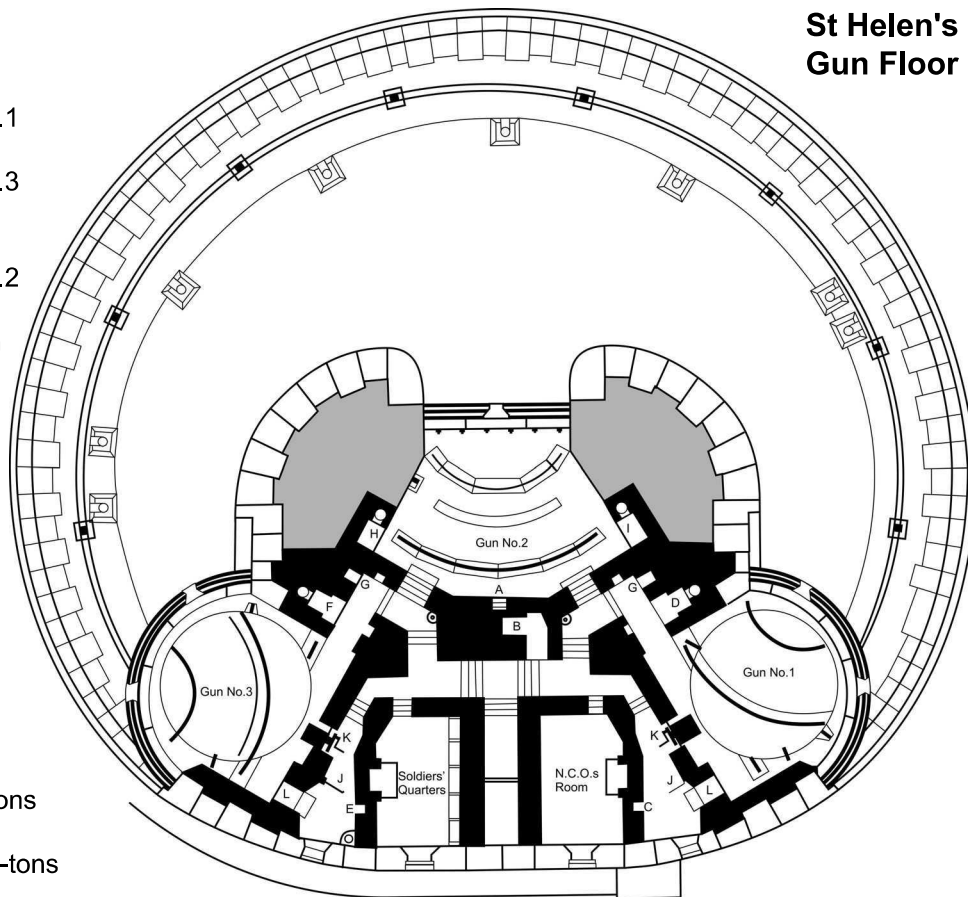
- S Searchlights installed 1916

**St Helen's Fort
Additional Works**

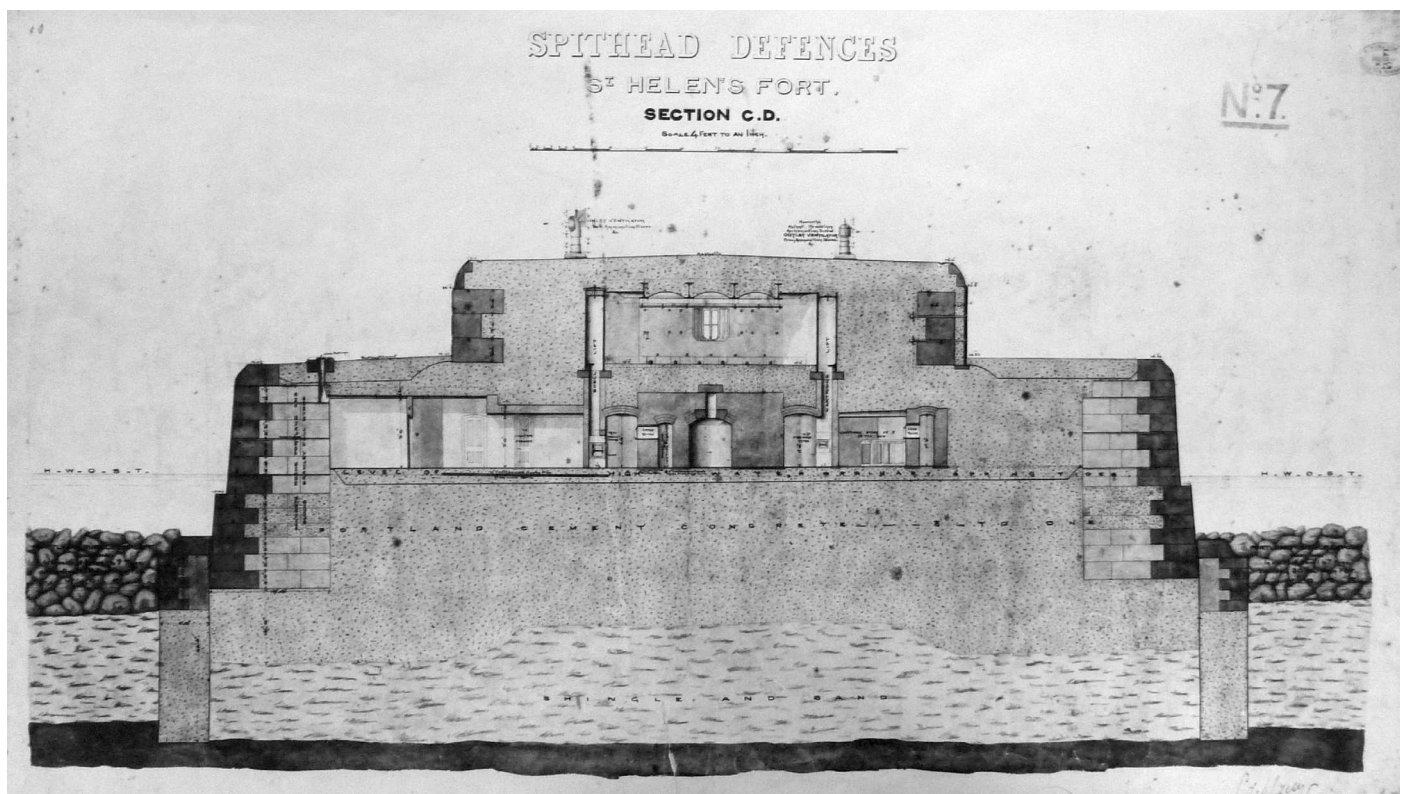


- A Stairs to Roof
- B General lift
- C Shell Lift no.1
- D Cartridge Lift no.1
- E Shell Lift no.3
- F Cartridge Lift no.3
- G Shell Recess
- H Shell Lift no.2
- I Cartridge Lift no.2
- J Davit
- K Turntable Winch
- L Shell Hatch

**St Helen's Fort
Gun Floor Plan 1879**



Gun No.1 & 3
10-inch R.M.L. 18-tons
Gun No.2
12.5-inch R.M.L. 38-tons

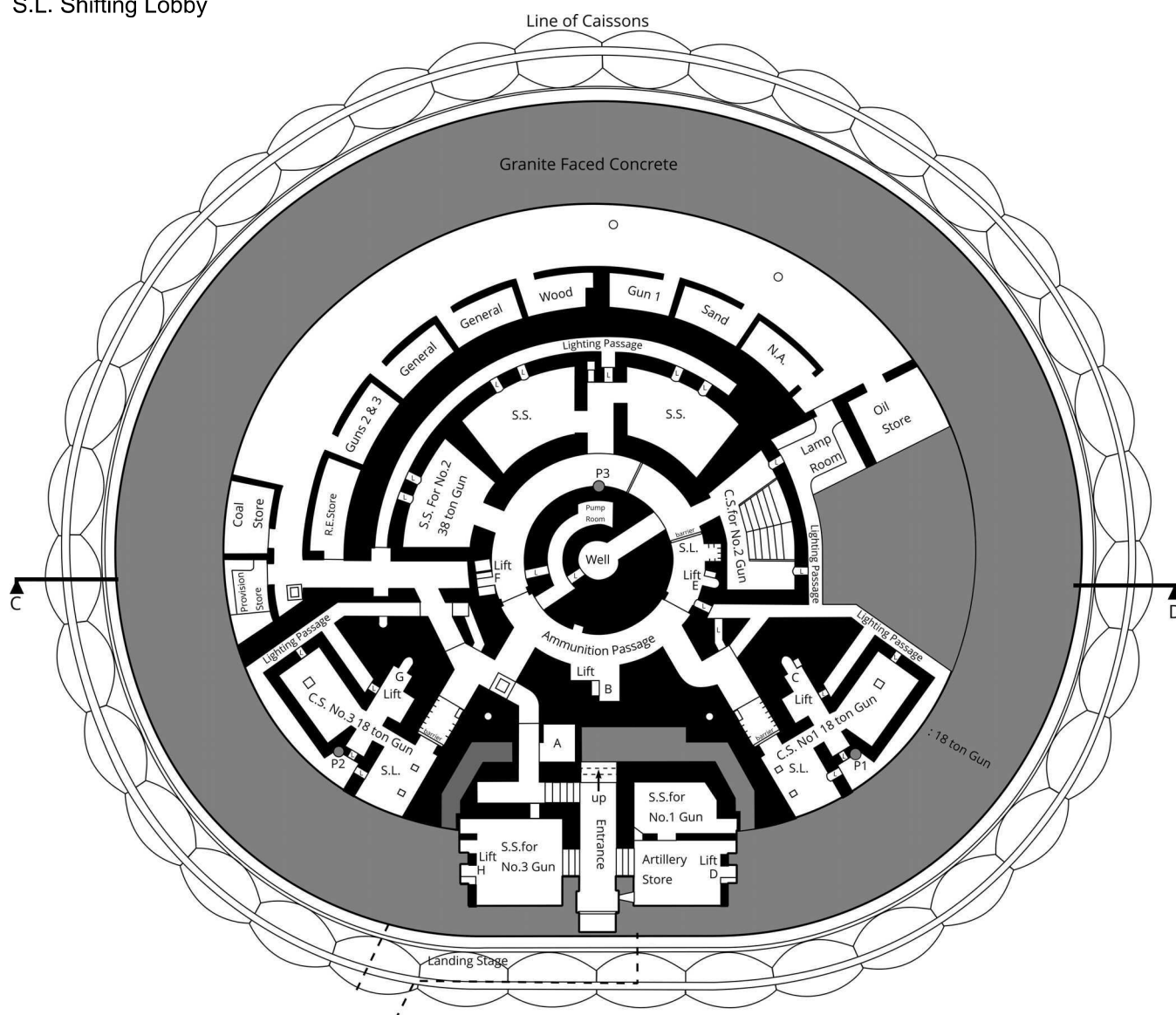


St Helen's Fort Basement Plan 1879

- A No.4 Store
- B General Lift
- C Cartridge Lift for Gun No.1
- D Shell Lift for Gun No.1
- E Cartridge Lift for Gun No.2
- F Shell Lift for Gun No.2
- G Cartridge Lift for Gun No.3
- H Shell Lift For Gun No.3
- N.A. Not Appropriated
- L Lamp Recess
- P1 Pivot of Right Turntable Gun No.1
- P2 Pivot of Left Turntable Gun No.2
- P3 Pivot Point for Gun No.3
- S.L. Shifting Lobby

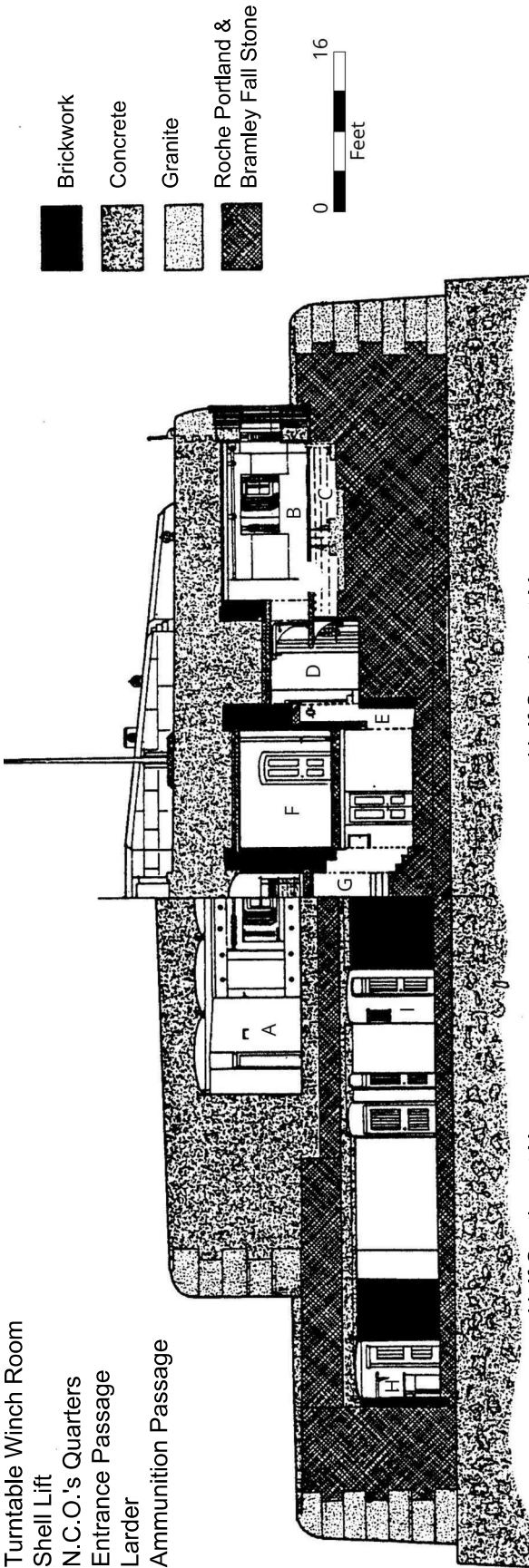


- C.S.No.1 160 cylinders
- C.S.No.2 210 cylinders
- C.S.No.3 160 cylinders



St Helen's Fort
Section through Fort

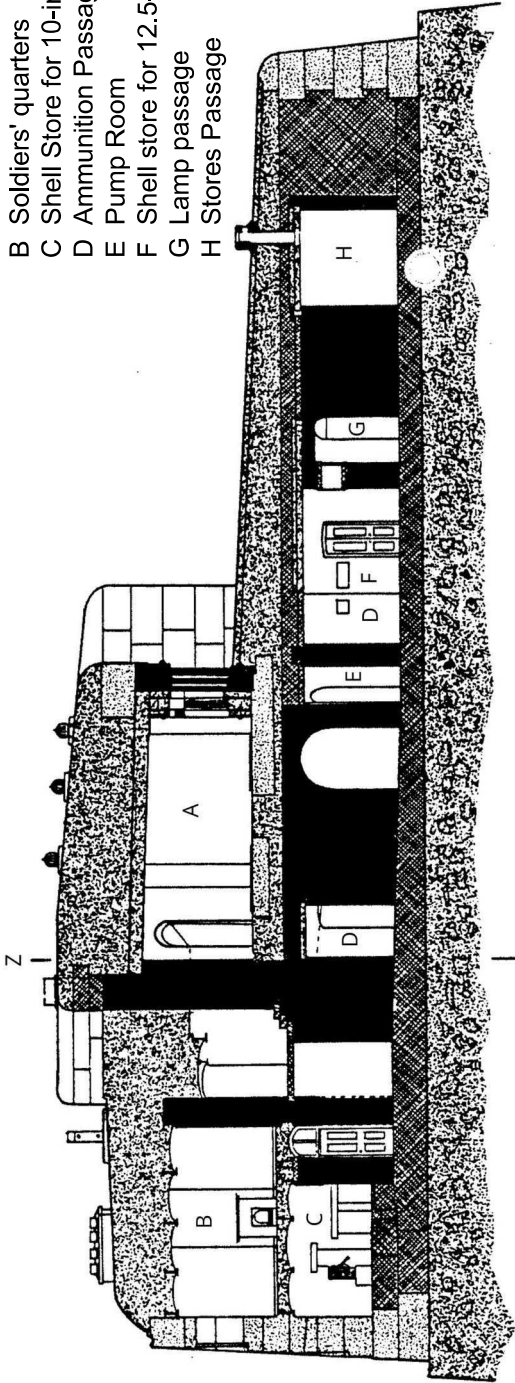
- A Casemate for 12.5-inch R.M.L. gun No.2
- B Casemate for 10-inch R.M.L. gun No.1
- C Turntable platform
- D Turntable Winch Room
- E Shell Lift
- F N.C.O.'s Quarters
- G Entrance Passage
- H Larder
- I Ammunition Passage



- A Casemate for 12.5-inch R.M.L. gun No.2
- B Soldiers' quarters
- C Shell Store for 10-inch gun No.3
- D Ammunition Passage
- E Pump Room
- F Shell store for 12.5-inch gun No.2
- G Lamp passage
- H Stores Passage

Half Section at Y

Half Section at X



Section at Z Z

Glossary of Military Terms

Arc of Fire The lateral range of a gun or gun battery.

Artesian well. A borehole in the ground through which water rises under hydrostatic pressure.

Battery Observation Post A structure used for keeping observation on the area commanded by the gun battery and for determining the range of potential targets.

Bombproof A vaulted casemate or building covered with earth or concrete to withstand plunging shell fire.

Boom Defence. A net place across the mouth of a harbour or between the forts, to prevent enemy submarines from entering the protected area.

Bore The inside of a gun barrel.

Bramley Fall Stone. A light brown sandstone quarried near Leeds. **Breastwork** Earth piled up in the form of a rampart.

Breech-loading gun (B.L.) A gun loaded from the rear of the breech of a gun barrel.

Cartridge A bag containing propellant. For guns with sliding breech mechanism, this is replaced with a brass cartridge case.

Casemate A bombproof vault of brick or stone, usually covered with earth, which provided an emplacement for a gun or living quarters for soldiers.

Case shot A cylinder of thin metal filled with cast-iron shot and fired from a gun as an antipersonnel measure.

Caisson. A box constructed in the sea to keep out the water, while the foundations are excavated.

Central pivot Mounting A pivot mounting designed around a shaft sunk in the ground.

Cheesewring or Colcerrow A grey granite from Cornwall

Corbel A projection from the face of a wall supporting another structure.

Dolphin Staging built in the sea, alongside which, ships or boats are moored.

Embrasure Opening in parapet or casemate front through which cannon could be fired.

Enceinte The space enclosed by the fort.

Enfilade Fire directed from the flank of a fort so that projectiles will rake the length of a rampart without the garrison being able to reply.

Escarp or Scarp The side of the ditch nearest the fort.

Expense magazine A small magazine in which ready-to-use ammunition was stored near the guns.

Fire Control Post The place from which, a gun group or group of gun groups are run -oiled.

Flanking Fire Fire directed at the side of an attacker.

Flanking Gallery A passageway with embrasures to provide fire along a length of wall or ditch.

Glacis A sloping earth bank in front of the walls of a fort.

Gorge The rear face of a fortification.

Grapeshot Iron pieces fired from a gun.

Muzzle-loader Any gun loaded from its front (muzzle) end.

Outwork A defensive work outside the main fort.

Parados Rampart protecting the rear of a fortification.

Position finding cell A small compartment fitted with a device for locating the lateral portion and range of a target.

Quick-firing gun A gun designed with a quick-acting breech mechanism and using one piece ammunition or a separate projectile and brass cartridge case.

Racer track Curved iron track set in the ground on which a gun is traversed.

Rampart Fortified embankment topped by a parapet.

Rifled gun A gun whose bore was cut along its axis with spiral grooves so as to &ping an elongated shall and makes its flight more accurate.

R.M.L. Rifled Muzzle-loading gun.

Roach Portland stone. A limestone of particularly hard-wearing qualities, much favoured for the building of breakwaters end harbours. Quarried in the Isle of Purbeck.

Runcorn stone A darkish-red sandstone quarried in Runcorn, Cheshire.

Saddle mounting or casemate saddle mounting. A bracket fitting across the top of an embrasure to take a light gun.

Shell A hollow projectile filled with shot and a bursting charge or just high explosive, both of which would discharge metal fragments over a given area.

Shifting lobby A room between the magazine and the outside, to enable magazine workers to change their clothing.

Terreplein Broad level fighting platform on the rampart behind the parapet. **Trace** The outline plan of a fort.

Traverse (1) To swivel a gun and its carriage, usually to point them at a target. (2) An earth bank positioned so as to protect troops from enfilade fire or to minimize the affect of a bursting shell.

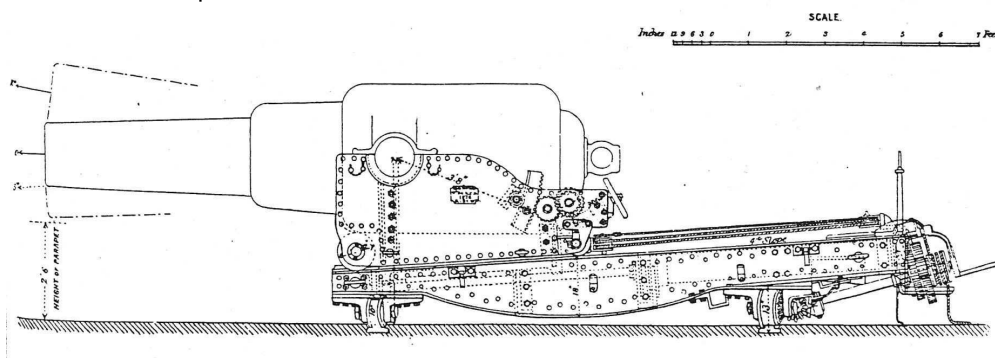
Traversing platform Wooden or metal platform which supported a gun and its carriage and which could be traversed on racer track.

Yoke mounting A special mounting developed for the forts, to enable the load of the gun to be spread between the floor and the roof and to stop the gun from jumping when fired.

Abbreviations

B.L.	Breech Loader
B.O.P.	Battery Observation Post
D.E.L.	Defence Electric Light
Q.F.	Quick Firing
N.C.O.	Non Commissioned Officer
R.B.L.	Rifled Breech Loading
R.M.L.	Rifled Muzzle Loading

10-inch R.M.L. on a casemate platform as on St. Helen's Fort



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Plans

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Horse Sand Fort in 2011



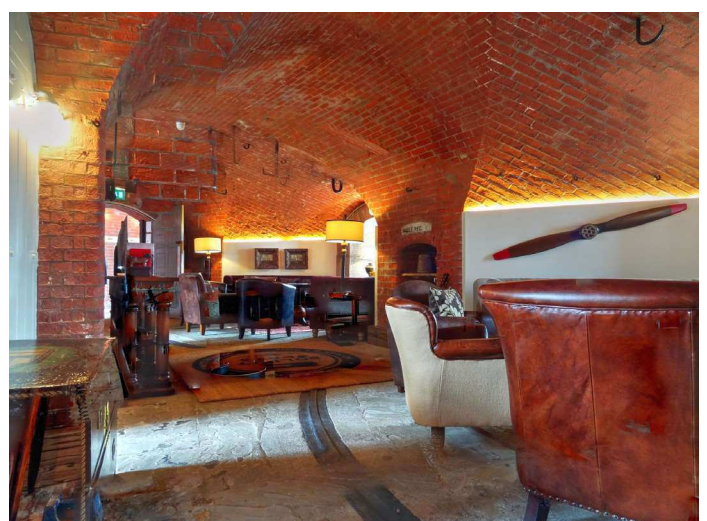
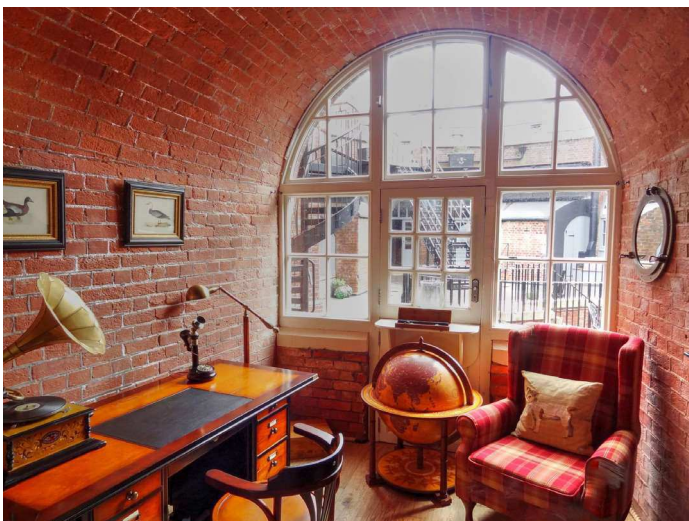
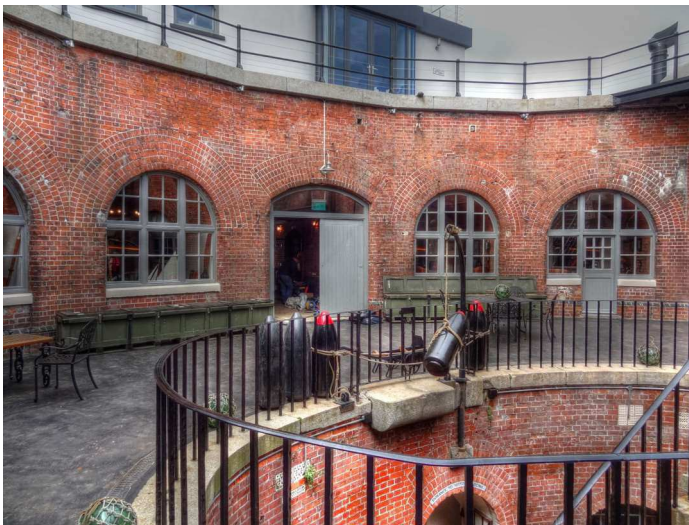


Above: No Man's Land Fort in 2018.

Right & Below Right: Horse Sand Fort in 1996

Below Left: Spit Bank Fort in 2012

Bottom: Spit Bank Fort in 2012 after restoration and conversion to a hotel.





St Helen's Fort in 2004



St Helen's Fort: Gun embrasure for 10-inch R.M.L. in 2004



St Helen's Fort in 2004



St Helen's Fort: Gun Floor



St Helen's Fort in 2015



St Helen's Fort: Old Postcard

